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Research Center
Beltsville, Maryland

May 1987

National Potato Germplasm Evaluation and Enhancement Report, 1986

Fifty-Seventh Annual Report
by Cooperators

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UNITED STATES DEPARTMENT OF AGRICULTURE
BELTSVILLE AGRICULTURAL RESEARCH CENTER (BARC), BELTSVILLE,
MARYLAND, AND CHAPMAN, ECHO LAKE, AND AROOSTOOK FARMS,
PRESQUE ISLE, MAINE

R. E. Webb and R. W. Goth, BARC, and D. R. Wilson, Presque
Isle, Maine

BARC

BREEDING: Four hundred eighty-six crosses were made among 88 virus-viroid tested parental clones and varieties. The season was excellent for seed set, and about 400,000 true seed were harvested. Emphasis in the crossing program continued on producing high quality, long-russet types, improved chip quality from extended low-temperature storage among round whites, and improved pest resistance in red-skin types. Field resistance to late blight, southern bacterial wilt, and bacterial soft rot of tubers was added to the diversity of biotic stress resistances being considered in the overall crossing program.

About 27,000 first-year seedling tubers were produced from 157 parental combinations. Approximately 15,000 seedling tubers were sent for planting on Chapman Farm, Presque Isle, Maine, 1,100 were sent for bacterial wilt resistance tests to Hastings, Florida, and the remainder were shared with Minnesota and North Carolina.

EVALUATION: Selections from progenies segregating for resistance to potato viruses X (PVX) and Y (PVY) were screened at BARC. Seventy percent of selections tested resistant to PVX and 70% tested resistant to PVY. Sixty-one percent of the selections were resistant to both PVX and PVY.

Golden Nematode: Dr. William Brodie successfully tested 325 selections for resistance to Race A of the golden nematode. One hundred twenty-two clones or 37.5% of the tested clones proved resistant to the nematode.

Bacterial Wilt: One hundred sixty-six clones were selected (Dr. P. E. Weingartner, Agricultural Research Center) as resistant/tolerant in the bacterial (BW) test plot at Hastings, Florida. Each clone was increased in the greenhouse and tested for presence of viruses during August-November at BARC. Eighty-six clones produced adequate tubers for (1) retest for BW resistance/tolerance at Hastings and (2) plant a 4-hill seed increase plot in Maine during 1987.

Wart: Dr. K. G. Proudfoot, Research Station, St. John's, Newfoundland, Canada, tested 15 "B" clones in duplicate plots for reaction to potato wart. B9792-61 (round white) did not contract the disease and was rated very highly resistant. B0045-6 (russet) showed only a trace of the disease in one

plot and was rated highly resistant to wart infection. Both clones have been used extensively as parents in the BARC crossing program.

Rhizoctonia: Among 15 items evaluated for tolerance/resistance to Rhizoctonia, Dr. Simeon Leach rated B9792-61 (round white) with superior tolerance/resistance and B9922-11 (russet) with excellent tolerance/resistance to visible infection. These and additional items are being tested further.

Laal-e-Faisal Variety, Pakistan: A number of highly promising selections have been made in Pakistan, beginning in 1974, from BARC-furnished first-year seedling tubers and clones. One of the earlier selections, FB9003-3, has achieved varietal status following intensive evaluation by provincial and national research personnel, seed growers, and fresh market producers. The clone has a red skin, is widely adapted, of excellent quality, and is tolerant to a number of production stresses. It has been named the Laal-e-Faisal (Pearl of Pakistan) variety. Laal-e-Faisal was approved for foundation-certified seed and fresh market production by Pakistani authorities in 1986. Additional clones might well achieve varietal status in the near future.

Meristem-Tissue Culture Facility, Vegetable Laboratory, BARC: A meristem-tissue culture facility with supporting growth chambers and greenhouse was established in 1986 to develop disease-free stocks of promising BARC-developed germplasm and clones for long-term maintenance, as a source of seed for multiplication on the foundation seed Chapman Farm facility, Presque Isle, Maine, and plantlet/tuberlet distribution to cooperators. Dr. Robert W. Goth will supervise operations of the facility.

Presque Isle, Maine

CHAPMAN FARM: Approximately 15,000 seedling tubers, mostly russets from 76 parental combinations, were planted on Chapman. Mild selection pressure was placed on the population to improve enhancement of germplasm opportunities through intensive evaluations in the various stress resistance/tolerance plantings at BARC on Aroostook Farm and elsewhere in 1987. All of the materials replanted in 1986 on Chapman were done in tuber units, with 6 feet between rows and 4 feet between units, to facilitate virus-viroid indexing of all materials well before bloom time, in part, to establish a virus-tested clonal "flush-out" system of seed production on Chapman Farm. To further insure freedom from disease of 1987 replant stocks, tuber units of each clone were hill-indexed in the greenhouse at BARC during the winter months. Duplicate plantings of the Chapman stocks were planted on Echo Lake in 1986 for further evaluation and seed distribution for evaluation during 1987.

ECHO LAKE: The russet yield trials (Tables 5, 6, 7) and clonal maximum seed increases were major plantings on Echo Lake. Duplicate plantings of Chapman stocks gave additional information on clonal productivity, tuber type, and processing qualities. Small whole tubers collected each 5 feet down the row of plantings at harvest of 19 selections were entered in the south Florida seed index plantings done by the Maine Potato Seed Board for assessment of possible viral infection and other major diseases. Richard Moore, Maine Department of Agriculture, did the visual inspections and did not note any diseased plants among the clones. Seed of 10 of the clones, which include B9792-8B, B9792-158, B0172-15, B0240-11, B0242-2, B0243-18 (round white chip types), B0032-40 (red), B9922-11, B0045-6, and B0220-14 (russet types), are being furnished to Sangerville in 1987 for seed increase and evaluation by members of Regional Potato Project NE-107 beginning in 1988. Concurrently, these and additional clones are being evaluated further for adaptability and quality assessments by cooperators along the Atlantic seaboard and elsewhere in 1987. Limited seed increases were done on russet clones B9569-2, B9596-2, B9922-11, B0045-6, red clone B0032-40, and round white clones B9792-61 and B9792-157 as backup seed for further grower trials in 1987.

AROOSTOOK FARM: The round white and red clone yield trials (Tables 2, 3, 4) were done on Aroostook Farm. Maintenance of about 150 domestic, 15 foreign varieties, and germplasm with specific characteristics continued.

Late Blight: Twenty-seven newly selected clones together with 19 clones previously testing highly resistant in 1984 and 1985 trials were entered in the 1986 late blight test plot. The planting, including the check rows, were inoculated twice with the organism in the evening hours during the second week in July. Final assessment of disease incidence was made on September 16. Fifteen new selections, all 19 of the older selections and the highly resistant parents, were either free of infection or showed only a few small lesions on older lower leaves. Many of the highly resistant selections also possess resistance to PVX, PVY, and the golden nematode. Total solids content and fry capability of these multidisease-resistant clones tend to be only minimally acceptable with a few exceptions. To improve the potential for selecting improved horticultural germplasm among the multidisease-resistant selections, approximately 6,000 "B-"size first-year seedling tubers from selected tuber progenies will be planted in the isolated late blight plot in 1987. Rigorous insect control will be followed to minimize virus infiltration.

Verticillium Wilt-Pinkeye: Seed pieces were dipped in Verticillium albo-atrum inoculum (80,000 propagules/ml) and planted immediately (June 21). Final wilt readings were made on September 6 and pinkeye data collected on 10 tubers/clone/replications at harvest, October 14. Of the 255 clones tested, 26 were as resistant/tolerant as the resistant check varieties Abnaki and Russette. Twenty-four clones showed significant tolerance to apparent plant infection as well as severity of wilt symptom development. The remaining clones showed similar reactions as the susceptible check varieties Kennebec and Superior. Incidence of pinkeye was minimal due, in part, to lack of moisture during part of the prime infection period and abnormally low temperatures (Table 1) which prevailed beginning in late August.

Scab: Seed pieces of 268 clones and varieties were dipped in a solution containing the organism previously tested for pathogenicity on radish and planted immediately on June 3. Harvest was done on September 17, and incidence of scab recorded. Seventy-six clones were assessed as resistant as the check varieties Superior, Ontario, and Russet Burbank. The remaining clones showed lesion development in one or more replications similar to the susceptible check Green Mountain.

Processing: Samples stored at 45° F and 50° F were processed into chips and french fries after 4-4-1/2 months' storage. Out-of-grade items in the 45° F storage samples were reconditioned at 60° F for 3 weeks before processing.

Potato chips were made from each sample by taking 1/16-inch slices from cross- and lengthwise sections of each tuber. Lengthwise chips were used to detect possible increase in reducing sugars, particularly near the stem end. Slices were rinsed in water and placed on paper towels to remove excess moisture. Chips were then fried at 340° F in Primex vegetable shortening until bubbling ceased.

Long tuber types were processed only into french fries. A 3/8-inch diameter plug was cut from the cross- and lengthwise sections of each tuber, washed, dried, and fried at 360° F for 5 minutes.

Each potato chip and french fry was classified after frying into color classes. Chip classes ranged from 1 = very light to 10 = very dark. French fry classes ranged from 1 = very light to 5 = very dark. Weighted averages were calculated by multiplying the number of chips or fries in each color class by the color class, totaled, and divided by the number of chips or french fries in each sample. Color ratings were made by using the PCII reference color chart 1206-U.

After color classification, each french fry plug was broken open and internal texture classification as 1 = mealy, 2 = intermediate, or 3 = soggy, and a weighted texture index calculated.

Summary

Multidisease-resistant germplasm development with improved horticultural traits, including processing qualities and wide adaptability among the russet, white, and red-skin types, is progressing satisfactorily. Tuber yellow flesh has been added to the germplasm base to better serve some of our foreign cooperators as well as, perhaps, provide varieties for export opportunities by the U.S. foundation certified seed industry.

Weather conditions (Table 1) prevailing during 1986 had a significant impact on clonal yields and processing qualities (Tables 2-6). Apparently the warm dry July and moist August affected tuber set and enlargement. Cool temperatures in late August and September, no doubt, had an adverse affect on further tuber enlargement of some clones as well as a highly significant negative impact on processing quality of most if not all clones in trial (Tables 2-6).

We will continue assessing commercial potential of clones, among which are B9792-8B, B9792-61, B9792-157, B9792-158 (round whites), B0032-40 (red), B9596-2, B9922-11, B0045-6, and B0220-14 (russets). About 20 new round white chip types are scheduled for maximum seed increase in 1987 and preliminary commercial trial in 1988. Approximately 65 new russets will be planted in multilocation adaptability trials along the Atlantic seaboard in 1987.

BARC Table 1. Weekly average maximum and minimum temperatures and total weekly rainfall from early May to early October, Aroostook Farm, Presque Isle, Maine, 1986.

Week Ending	Avg. Temperature F		Rainfall
	Max.	Min.	Inches
May 4	56.6	34.3	.35
11	66.4	33.4	.12
18	72.0	45.3	1.10
25	68.0	46.6	2.71
June 1	65.0	42.9	.52
8	72.0	46.4	.74
15	70.3	46.1	.24
22	76.3	45.0	.28
29	72.0	47.4	.39
July 6	73.6	49.7	.69
13	68.3	51.0	1.07
20	78.4	55.3	.43
27	78.6	56.1	.41
Aug. 3	73.6	57.0	1.79
10	74.4	55.9	2.24
17	75.1	56.3	.46
24	71.3	48.7	2.04
31	66.4	43.4	.27
Sept. 7	63.3	40.6	.18
14	62.9	43.9	1.80
21	58.4	36.0	.77
28	63.1	42.1	1.70
Oct. 5	54.9	35.9	.34
12	53.4	35.6	.34
Total			20.98

BARC Table 2. Yield, tuber size distribution, and quality characteristics of round whites harvested 114 days after planting on Aroostook Farm, 1986.

Pedigree	Mkt CWT/A	% Mkt	Tuber size distribution						Tuber Rating ¹	Spec Grav ²	Chip Color ³		
			1-7/8-		2-1/4-		3-1/4-				4 mos		
			<1-7/8"	1-7/8- 2-1/4"	2-1/4- 3-1/4"	3-1/4- 4"	4"	>4"			50°F	45°F	21 days 40°-60°F
B9140-32	319	93	6.8	32.9	55.4	4.3	0.7	5	83	7.4	8.2	7.5	
B9792-8B	374	88	6.2	18.5	57.3	12.5	5.6	4	89	7.5	9.1	8.2	
" -16B	322	90	6.9	21.4	58.0	10.7	2.9	4	78	8.3	8.9	8.3	
" -53	297	90	7.6	29.0	55.6	5.7	2.1	5	88	7.2	8.2	7.7	
" -61	312	95	5.4	22.2	53.7	18.7	0.0	5	76	7.1	8.4	7.7	
" -157	367	94	5.4	22.6	52.4	19.0	0.6	5	76	7.1	8.8	8.2	
" -158	422	85	5.8	20.6	53.7	10.7	9.2	5	80	7.9	9.2	8.2	
" -196	289	89	11.1	36.2	47.9	4.7	0.0	6	75	7.2	8.4	7.8	
B9955-10	284	84	15.8	46.1	36.5	1.6	0.0	6	81	6.9	7.2	7.3	
" -11	284	87	12.8	30.0	50.1	7.6	0.0	5	77	7.1	8.5	8.0	
" -18	296	93	7.2	22.2	58.2	12.3	0.0	4	76	8.4	9.4	9.2	
" -33	286	93	7.0	25.8	55.8	11.4	0.0	4	78	6.6	7.6	7.3	
" -46	360	89	4.5	13.9	53.0	22.1	6.5	5	71	7.0	7.4	8.1	
Atlantic	369	93	4.0	14.6	57.8	20.8	2.8	6	81	8.4	9.5	9.0	
Monona	279	93	6.3	19.5	60.4	12.7	1.0	5	65	6.6	7.6	7.1	
LSD 5%	47												

¹1 = poor; 9 = outstanding.

²1.0 omitted.

³Chips; 1-7 satisfactory.

BARC Table 3. Yield, tuber size distribution, and quality characteristics of round whites harvested 114 days after planting on Aroostook Farm, 1986.

Pedigree	Mkt CWT/A	% Mkt	Tuber size distribution					Tuber Rating ¹	Spec ² Grav	Chip Color ³				
			<1-7/8"	1-7/8- 2-1/4"		2-1/4- 3-1/4"				3-1/4- 4"	>4"	4 mos		21 days 40°-60° F
												50° F	45° F	
B0286-11	337	89	11.3	34.7	48.8	5.2	0.0	4	78	8.5	9.5	9.6		
B0287-1	336	91	7.8	20.6	52.8	17.7	1.0	3	66	8.5	8.9	9.4		
" -3	340	82	2.9	10.9	36.7	33.8	15.6	5	56	9.6	9.9	9.9		
" -15	289	87	4.3	15.1	45.9	25.8	8.9	4	70	8.7	9.0	9.4		
B0288-8	323	87	12.1	41.4	40.9	5.1	0.5	5	78	9.0	9.3	9.9		
" -17	291	92	7.7	33.7	51.1	7.5	0.0	5	88	8.1	8.6	9.0		
" -19	369	90	5.4	17.6	48.7	23.5	4.8	4	72	9.6	9.9	9.9		
" -26	362	92	7.5	25.0	50.8	15.8	1.0	6	71	9.6	9.8	9.9		
" -29	267	93	17.5	45.7	26.0	9.0	1.8	3	70	8.6	9.0	9.3		
B0292-4	241	82	18.1	44.4	31.0	6.5	0.0	4	70	8.6	8.9	9.0		
B0297-2	409	93	4.3	16.7	56.9	15.2	2.3	6	70	9.2	9.5	9.4		
" -4	330	90	8.1	25.6	55.7	8.9	1.7	4	55	8.6	9.0	9.1		
B0298-6	295	81	19.5	38.0	35.9	6.6	0.0	5	72	8.8	8.7	8.8		
Atlantic	290	88	5.1	18.2	52.8	17.0	6.9	5	77	9.5	9.7	8.3		
Monona	268	91	7.8	22.8	58.2	10.4	0.8	5	61	6.7	6.8	7.2		
LSD 5%	54													

^{1 2 3} See footnotes Table 2.

BARC Table 4. Yield, tuber size distribution, and quality characteristics of round whites harvested 114 days after planting on Aroostook Farm, 1986.

Pedigree	Mkt CWT/A	%	Tuber size distribution						Tuber Rating ¹	Spec Grav ²	Chip Color ³				
			<1-7/8"		1-7/8-2-1/4"		2-1/4-3-1/4"				3-1/4-4"		4 mos		21 days 40°-60°F
													50°F	45°F	
B0048-9	417	88	2.7	10.8	45.1	31.1	10.3	5	71	8.8	9.6	9.3			
B0175-20	407	93	2.8	13.2	49.4	30.4	4.2	6	92	8.0	9.1	8.2			
B0179-5	280	90	7.6	42.3	45.2	2.9	0.0	4	79	9.1	9.7	9.7			
" -17	432	95	4.7	23.7	53.3	17.8	0.5	4	84	8.5	9.1	8.3			
B0237-6	305	94	6.5	30.1	53.6	9.8	0.0	6	75	6.5	7.3	7.3			
B0238-11	255	87	12.9	40.0	43.4	3.1	0.6	6	71	7.4	8.6	8.0			
" -13	314	87	10.5	30.7	48.7	7.4	2.7	5	75	7.2	8.4	7.8			
B0240-11	330	93	6.0	29.6	54.8	8.6	1.0	5	74	7.0	8.7	7.7			
B0246-6	346	95	4.0	16.7	52.9	25.5	0.8	5	71	7.7	8.7	7.5			
B0257-8	283	89	10.6	39.9	41.8	7.7	0.0	4	86	6.3	7.2	7.3			
Atlantic	374	90	5.9	16.8	54.9	18.3	4.0	5	82	9.4	9.7	9.0			
Monona	316	92	6.0	20.3	53.0	18.5	2.2	6	64	7.1	7.8	7.1			
LSD 5%	56														

^{1 2 3} See footnotes Table 2.

BARC Table 5. Yield, tuber size, and quality characteristics of russets harvested 113 days after planting, Echo Lake, 1986.

Pedigree	Mkt CWT/A	% Mkt	Tuber size distribution					Tuber Rating ¹	Spec Grav ²	French fry			
			<2 oz	2-6 oz	6-10 oz	10-16 oz	>16 oz			³ Color/texture ⁴			
										4 mos	21 days		
													50°F
B9569-2	279	89	10.6	41.0	39.1	9.3	0.0	5	69	4.7	2.2	4.5	2.2
B9596-2	398	92	3.2	26.9	44.7	20.7	4.5	6	71	4.9	2.1	4.6	2.2
B9740-5	333	85	10.1	39.9	34.9	10.3	4.8	4	81	3.7	1.9	3.0	2.0
B9812-2	336	87	12.3	52.4	26.3	8.4	0.6	7	75	3.3	2.0	3.3	2.0
B9880-17	339	94	3.6	20.1	48.6	25.2	2.5	7	58	5.0	2.0	5.0	2.3
B9882-16	249	90	8.8	42.0	36.6	11.3	1.3	6	65	4.0	2.1	3.9	2.0
B9885-4	369	86	8.5	36.0	36.6	13.4	5.5	6	59	3.7	2.0	3.8	2.2
B9922-11	380	90	2.5	18.7	45.9	25.1	7.8	6	76	3.5	2.0	3.9	2.0
B9924-22	383	96	3.6	24.8	49.8	21.2	0.6	6	62	3.1	2.0	2.8	2.0
Russette	397	92	3.5	19.5	51.0	22.2	3.8	6	79	3.9	2.0	4.1	2.0
NemaRus	418	85	5.4	24.4	35.5	26.4	9.3	5	63	4.1	2.0	4.0	2.0
LSD 5%	51												

¹1 = poor; 9 = outstanding.
²1.0 omitted.
³French fry color: 1-3 = satisfactory.
⁴French fry texture: 1-2 = satisfactory.

BARC Table 6. Yield, tuber size, and quality characteristics of russets harvested 113 days after planting, Echo Lake, 1986.

Pedigree	Mkt CWT/A	% Mkt	Tuber size distribution					Tuber Rating ¹	Spec Grav ²	French fry			
										³ Color/texture ⁴			
			<2 oz	2-6 oz	6-10 oz	10-16 oz	>16 oz			4 mos	50°F	21 days 40°F-60°F	
B9926-25	210	79	21.4	60.1	17.4	1.1	0.0	4	67	3.3	1.9	3.1	1.9
B9932-50	324	86	5.8	29.3	37.0	19.9	8.0	5	86	4.1	2.0	4.0	2.0
B9933-9	306	96	3.4	26.7	60.4	8.8	0.7	6	61	2.4	1.9	2.4	2.0
"- 19	307	95	4.0	26.5	60.0	8.6	0.9	6	63	3.0	2.0	2.6	2.0
B9937-1	283	90	7.9	33.5	51.5	7.1	0.0	5	63	2.9	2.0	2.9	2.2
B0011-16	282	91	7.8	36.7	40.5	14.0	1.0	7	72	2.8	2.0	3.0	1.9
B0012-7	269	92	6.9	40.5	40.3	11.5	0.8	6	74	3.3	2.3	3.0	2.0
"- 16	241	83	17.4	59.2	21.5	1.8	0.0	4	77	4.3	2.0	4.2	2.0
B0023-4	247	86	13.2	39.8	37.0	9.2	0.8	5	71	3.6	1.9	4.3	2.1
B0036-6	330	92	5.4	27.6	43.6	21.0	2.4	5	68	3.4	2.0	3.2	2.0
"- 10	244	88	9.6	45.3	29.8	13.3	2.0	5	74	4.1	2.1	3.8	2.1
Russette	433	94	2.0	15.6	51.3	27.0	4.1	5	75	4.4	2.0	4.3	2.0
Russet													
Burbank	346	83	15.5	40.4	30.4	12.2	1.5	4	77	4.1	2.1	4.1	2.0
LSD 5%	46												

¹ ² ³ ⁴ See footnotes Table 5.

BARC Table 7. Yield, tuber size, and quality characteristics of russets harvested 113 days after planting, Echo Lake, 1986.

Pedigree	Mkt CWT/A	% Mkt	Tuber size distribution					Tuber Rating ¹	Spec Grav ²	French fry			
			<2 oz	2-6 oz	6-10 oz	10-16 oz	>16 oz			³ Color/texture ⁴			
										4 mos 50°F	21 days 40°F-60°F		
B0042-2	307	84	11.2	31.1	33.3	19.0	5.3	3	66	4.2	2.0	4.7	2.2
" -7	283	84	15.2	51.2	25.6	6.7	1.2	5	64	3.5	2.0	3.9	2.0
" -11	234	81	18.7	55.0	21.6	4.7	0.0	5	68	2.6	2.1	2.9	2.1
" -15	218	78	21.8	47.1	24.7	6.3	0.0	6	63	2.1	2.0	2.6	2.0
" -16	285	86	14.3	40.0	31.2	14.5	0.0	5	66	3.9	2.0	4.1	2.0
B0045-6	432	94	4.4	24.9	47.4	21.3	2.0	6	76	4.1	2.0	3.7	2.0
" -12	330	89	10.4	44.6	33.6	10.4	1.0	6	76	4.2	2.0	3.9	2.0
B0046-14	241	91	9.2	42.0	35.2	13.6	0.0	3	70	3.0	2.1	3.0	2.0
B0180-18	387	81	5.5	18.2	36.6	26.4	13.4	7	63	3.4	2.3	2.9	2.5
B0189-45	287	80	12.6	30.9	34.6	14.4	7.5	6	63	3.8	2.1	3.5	2.0
B0190-9	448	83	4.2	16.4	41.6	25.1	12.7	5	77	4.5	2.3	3.9	2.1
B0220-14	281	94	5.2	29.4	41.4	23.4	0.6	6	69	2.4	2.0	2.6	1.9
Russette	415	90	4.5	17.7	49.3	22.7	5.8	6	76	4.3	2.0	4.3	2.0
BelRus	280	88	11.2	40.5	32.2	15.4	0.7	6	74	4.3	2.0	4.4	2.0
LSD 5%	54												

^{1 2 3 4} See footnotes Table 5.

UNITED STATES DEPARTMENT OF AGRICULTURE
BELTSVILLE AGRICULTURAL RESEARCH CENTER (BARC)
BELTSVILLE, MARYLAND

L. L. Sanford, S. L. Sindén, W. W. Cantelo, and K. L. Deahl

Genetics, Chemistry,
Cell Biology, and
Pest-Plant Inter-
actions in Pest-
Resistance
Enhancement

Recurrent Selection for Potato Leafhopper Resistance: A Solanum tuberosum L. gp. Tuberousum population was recurrently selected for resistance to potato leafhopper (PLH) (Empoasca fabae, Harris). Primary selection was for low levels of nymphal infestation (nymphs/leaf) under natural infestation in field tests. The selection paradigm allowed completion of a selection generation per year. The original population and seven selection-generation populations were tested for PLH resistance for 3 years at two locations. Seven generations of selection reduced the level of nymphal infestation by 71% and severity of plant damage (hopperburn) by 45%. The rate of progress slowed in later generations.

Genetic Transmission of Potato Leafhopper Resistance: Solanum tuberosum L. gp. Tuberousum populations recurrently selected for resistance to potato leafhopper (PLH), Empoasca fabae (Harris), were crossed with ten PLH susceptible gp. Tuberousum breeding clones and cultivars to test for genetic transmission of resistance on a population basis.

When measured against the unselected population, seven generations of recurrent selection reduced nymphal infestation levels by 68% and hopperburn severity by 39%. Comparing progeny populations from (unselected population) x (susceptible clones) with (generation seven population) x (susceptible clones), nymphal infestation level was 35% lower and hopperburn severity 14% less in the latter cross. Therefore, roughly half the gain in nymphal resistance and about a third the gain in hopperburn resistance were transmitted to the progeny populations.

Segregation of Leptine Glycoalkaloid in S. chacoense: Foliar leptine levels in 60 S. chacoense accessions were determined in a search for high-leptine plants that might be useful in breeding for resistance to the Colorado potato beetle, Leptinotarsa decemlineata Say. New methods were developed for detecting and quantifying leptine glycoalkaloids. A wide range of levels (2-98 mg% fresh weight) was found among the accessions; most (42 of 60) apparently did not synthesize even traces of leptines. Among six sibs individually sampled from one accession, levels ranged from 2 to 306 mg % in replicated analyses. The results indicate that leptine glycoalkaloids are segregating widely among and within S. chacoense accessions. Tubers from high-leptine clones did not synthesize leptines even when greened or wound healed.

Leptine Glycoalkaloid and Resistance to Colorado Potato Beetle: The role of leptine glycoalkaloids in resistance to Leptinotarsa decemlineata (Say) was studied with S. chacoense Bitt. clones that had been selected for extremes of leptine level. Three high-leptine (120-306 mg/100 g fresh weight) clones, one from each of three accessions, were compared with three low-leptine (0-51 mg/100 g) sib-clones for number of adults and feeding damage in the field, adult feeding rate on leaf disks, and larval development on detached foliage. Number of adults per plant on the six clones ranged from 1.5 for the clone with the highest leptine level (306 mg/100 g) to 37.5 for a clone lacking even a trace of these rare glycoalkaloids. There were also wide and significant differences among the six clones for adult feeding damage, adult feeding on leaf disks, larval development rate on detached foliage, and survival to adult eclosion. Differences between the high- and low-leptine clone from each accession were significant for all five resistance parameters, and these differences appeared to be directly related to the concentration foliar leptines.

Leptine in S. chacoense-tuberosum Hybrids: In our screening of Solanum species for resistance to the Colorado potato beetle (CPB), Leptinotarsa decemlineata, we found a few clones of the wild species S. chacoense that were nearly immune to both adults and larvae. This resistance is apparently caused by the presence of rare glycoalkaloids, the leptines. Crosses were made to determine if leptine synthesis could be genetically transmitted to S. tuberosum x S. chacoense hybrids. Foliage and tubers of the parents and their offspring were analyzed by a combination of TLC and GLC methods. Of 227 S. tuberosum x S. chacoense hybrids tested, 162 (70%) were leptine-synthesizers. Leptines were not detected in any tuber samples. Results also show a wide segregation for levels of leptines within some of the S. chacoense accessions. Future tests are planned to determine if leptine levels are high enough in these leptine-synthesizing hybrids to affect CPB resistance.

Test Methods for Colorado Potato Beetle Resistance: A sensitive test was sought that could be used to detect small differences in resistance to the Colorado potato beetle (CPB) in Solanum species. Three tests were evaluated and compared. One test compared adult CPB foliage consumption of leaf disks from a susceptible potato cultivar (S. tuberosum) with disks from two S. chacoense clones. The second test compared weight gain on foliage from three plants by 4th instar larvae and the third test compared larval development rate and mortality. With sufficient replication all three tests could detect significant differences between each of the test clones. The most sensitive test measured the stage

of development of neonate larvae after feeding on test plants for four days. This test required only four replicates to detect a 50% difference from the overall mean, assuming an alpha level of 0.05 and a beta level of 0.10.

Protoplast Fusion Hybrid: Protoplasts from a clone of S. chacoense Bitt. that synthesizes the rare leptine alkaloids were fused with protoplasts from a dihaploid derivative of "Saco" (USW 2225, S. tuberosum L.). Leptine alkaloids have been shown to impart high levels of resistance to the Colorado potato beetle. Of the 21 plantlets regenerated from a polyethylene glycol fusion of 2.2×10^6 protoplasts, only three were vigorous and healthy appearing. These three regenerates have broad leaflets and closely resemble the S. tuberosum fusion parent in their leaf and vine morphology. Alkaloid analyses of foliage from one of the three regenerates with tuberosum-type morphology showed the rare leptine alkaloids of the S. chacoense parent. This regenerate also synthesizes solanidine found in the S. tuberosum parent. However, tomatidenol, synthesized in the dihaploid S. tuberosum parent, was not found in the foliage of the regenerate. Instead, this regenerate synthesizes a new alkaloid tentatively identified as OH-tomatidenol. The morphological and alkaloid characters of this regenerate indicate that it is a somatic hybrid between S. chacoense and S. tuberosum.

Variation Among Protoclones: Plants were regenerated from protoplasts of six commercial cvs, dihaploid S. tuberosum, S. chacoense, S. phureja, and hybrid S. tuberosum x S. berthaultii. Regenerated plants (protoclones) propagated from the 1st and 2nd tuber generations were examined for deviations from parental type in leaf morphology and color and plant habit. Chromosome numbers in root tips were determined in random plant samples from four of the ten protoclone populations and also in selected variant plants. Gross variation in leaf morphology was associated with altered chromosome number in 105 variant protoclones. The frequency of aneuploid protoclones varied with parent cv. Among protoclones derived from the six commercial cvs, aneuploid frequency varied from 23% of 123 Atlantic protoclones to 72% of 242 Chipbelle protoclones. All 61 protoclones derived from a dihaploid ($2N=2x=24$) S. tuberosum parent had broader leaves than the parent and all 38 examined for chromosome number were either aneuploid or tetraploid. Only two of 41 S. chacoense ($2N=2x=24$) protoclones had the parental chromosome number. The frequency of undersirable, gross morphological variation in protoclones from some of the parental cvs could be reduced by modifying the composition of the culture media.

Thirty protoclonal lines of Kennebec (resistant gene R₁) regenerated from mesophyll protoplasts were tested for reaction to a compatible (Race 1) or an incompatible (Race 4) race of Phytophthora infestans. Detached leaves were inoculated using an atomized spore suspension ($3-4 \times 10^6$ sporangia/ml), incubated 48 hr in a mist chamber, placed in a controlled environment chamber, and maintained by immersing their petioles in water until symptom expression. Symptoms of the late blight disease on detached leaves were similar to those on intact plants. Although disease reactions for most of the regenerates were similar to those of the single protoplast parent, there was considerable variation in response, ranging from hypersensitivity and minor necrosis (resistant response) to complete invasion and pathogen sporulation (susceptible response). Protoclone reaction to P. infestans was not correlated with chromosomal or morphological variation.

INTER-REGIONAL POTATO INTRODUCTION PROJECT (IR-1)

J. B. Bamberg and R. E. Hanneman, Jr.

Introduction of New Stocks

A total of 173 new introductions were added to the collection, received as 129 true seed accessions and 44 tuber clones. Of these, collections from the expedition to Bolivia, headed by R. W. Hoopes accounted for 115 and 22 of the seed and tuber accessions, respectively. New accessions of rare or disappearing species were added to the collection as a result of this expedition. Receipt of another 12 tuber clones is pending their release from quarantine. Sixty-three seedlots of advanced populations were received from F. L. Haynes for distribution.

Preservation and Increase of Stocks

Over 90% of the introductions in the collection are maintained as true seed. Satisfactory seed increases of 154 species introductions and intraspecific hybrids were obtained under glass, fiberglass or screen.

An additional summer seed increase in the field was planted to reduce a backlog of approximately 400 S. tuberosum Group Andigena accessions in need of increase. The results were disappointing due to late and scant flowering. Another increase of about 60 accessions was planted in the greenhouse in September to systematize accessions with taxonomic problems. This increase has proceeded satisfactorily.

Facilities for the maintenance of the collection were improved by the addition of a new screenhouse, reglazing of the fiberglass house, regraveling of screenhouse floors and replacement of the old and failing boilers. The system for preparation of potting soil was greatly improved. The labor saved was applied to the improvement of field plot maintenance and other summer tasks.

A 1,000 seed sample of each of 135 accessions was forwarded to the National Seed Storage Laboratory (NSSL) for backup preservation. An additional 226 accessions without PI numbers have been packaged and will be sent to NSSL when their PI assignments are received.

Germination percentages of 842 seedlots were determined.

This year 28 clonal stocks and 13 families (107 clones) were placed into in vitro culture. A total of 528 virus tests were done to assess the presence of PVS, PVX, PVY, PVA, PVM, PLRV and PSTV in the in vitro collection. Cultures found to have PSTV were removed from the collection. Cultures found to contain any of the other viruses were subjected to heat therapy or meristem culture resulting in 108 new virus-free lines. At present, 87% of the in vitro collection is virus-free. Nine hundred and eighty-six dot blot DNA

hybridization tests were made to check for the presence of PSTV among all plants used for seed and tuber increases as well as the resultant true seed lots produced. A test history on clonal stocks is updated regularly.

Classification

Taxonomic determinations were made on field plantings and herbarium specimens by Drs. J. G. Hawkes, J. P. Hjerting, R. W. Hoopes, K. A. Okada and T. R. Tarn. Over 1,640 plots were observed and taxonomic determinations were newly assigned, confirmed, corrected or revised. Paper and computerized records were updated accordingly. A total of 596 new herbarium sheets were made from these plantings. About 4,940 specimens from previous years were mounted such that a total of well over 5,000 sheets, representing nearly 115 potato species are now available for taxonomic study.

Distribution of Stocks

Shipments of seed, tuber, and in vitro stocks were sent to potato workers in 24 states of the United States and to workers in 16 other countries in response to requests. The volume of stocks sent to various consignee categories is summarized in the table below.

Distribution of IR-1 Stocks, 1986

Consignee	<u>Units Ordered</u> ¹				
	S	TF	TC	IVS	RPS
Domestic	5,561	1,738	195	112	1,271
Foreign	1,017	274	10	2	2
NSSL ²	135	0	0	0	0
Quarantine	177	0	0	0	0
Screening	4,425	0	0	0	0
Transfers	107	0	0	0	0
IR-1 use	4,196	0	70	0	2
Totals	15,618	2,012	275	114	1,275

^{1/} Types of Stocks sent/(Number of seeds, tubers or plantlets per standard shipping unit): S= True Seeds/(50), TF= Tuber Families/(21), TC= Tuber Clones/(4), IVS= in vitro Stocks/(1), RPS= USDA-WI Cooperative Research Programs Stocks.

^{2/} National Seed Storage Laboratory.

The tuber families orders shown above were requested from a listing of 267 accessions mailed to approximately 350 cooperators world-wide.

Evaluation of Stocks

The somatic chromosome numbers of 517 accessions were determined in the laboratory. Funds for contracts to state and federal laboratories were provided by USDA, ARS, and Special Grant Funds from USDA, CSRS for screening for resistance to bacterial ring rot, blackleg, early blight, leafhoppers and fleabeetles, as well as heat tolerance and

glycoalkaloid levels. Completed screening reports have been subjected to computer summarization. The resulting disease response ratings for Colorado potato beetle, potato leafroll virus, and Verticillium wilt have been entered into the computerized inventory record. The collection is steadily being evaluated for characteristics of economic importance through the research efforts of state, federal, and foreign laboratories.

Usefulness of Findings

The major objective of the Inter-Regional Potato Introduction Project is to promote and facilitate the improvement of the commercial potato in the United States by providing a readily available reservoir of useful breeding stocks. Breeders are constantly searching for new sources of superior germplasm and for ways to incorporate desirable genes into adapted commercial varieties. Accomplishment of the major objective of this program must be measured largely by the success with which new, improved varieties meet the needs of commercial production.

Three new potato varieties, Krantz, Reddale, and Tolaas were released for commercial production. The number of foreign introductions in their pedigrees are 6, 4, and 5, respectively. Of the 172 potato varieties developed and released in the United States since 1932, 168 have two or more foreign introductions in their pedigrees. These varieties represent about 65% of the annual seed potato production in the United States.

Basic research programs conducted in the United States and other countries continue to provide information concerning the potential value and necessity of more effective utilization of the IR-1 germplasm collection. During 1986 46 papers, 58 abstracts, and 11 theses reported the use of Solanum introductions.

NORTH CENTRAL REGIONAL POTATO TRIALS

R. H. Johansen and Cooperators^{1/}

The year 1986 was the 36th year that the North Central Regional Potato Variety Trials have been conducted and North Dakota has coordinated these trials for the past 25 years. Thirteen states and two Canadian provinces conducted trials in 1986. No trials were lost due to weather during 1986, however, because some of the Nebraska seed froze in transit, there were poor stands at several locations and Minnesota did not report data for seven of their entries.

There were no cultivars released in 1986.

Cooperating States and Provinces:

<u>State or Province</u>	<u>Date Planted</u>	<u>Date Harvested</u>	<u>Total Days to Harvest</u>
Alberta	5/13	10/17	157
Manitoba	5/23	9/11	121
Indiana	4/2	7/17	106
Iowa	4/22	8/12	112
Kansas	3/26	7/23	119
Kentucky	4/9	8/18	131
Louisiana	3/6	6/3	89
Michigan	5/1	9/26	148
Minnesota	4/10	8/19	131
Missouri	3/25	7/28	125
Nebraska	5/23	9/19	119
Ohio	5/7	9/17	133
North Dakota	5/20	9/29	132
South Dakota	5/16	10/7	144
Wisconsin	4/25	9/22	149

Environmental Conditions. Soils ranged from clay loam to sand with sandy soils being the most prevalent. Irrigation was used on some trials.

^{1/} Alberta, Mr. Clive Schaupmeyer; Manitoba, Mr. Brian Rex; Indiana, Dr. Hommer Erickson; Iowa, Mr. Bill Summers; Kansas, Dr. J. K. Greig; Kentucky, Dr. John Snyder; Louisiana, Dr. James Fontenot; Michigan, Dr. Richard Chase; Minnesota, Dr. Florian Lauer; Missouri, Dr. V. N. Lambeth; Nebraska, Dr. R. B. O'Keefe; Ohio, Dr. Robert Preucher, Dr. Mark A. Bennett; South Dakota, Dr. Paul Prashar; Wisconsin, Mr. Donald Kichefski, Dr. John Schoenemann, Dr. Stan Peloquin.

Cultural Practices. Fertilizer, insecticides, fungicides, vine killers, herbicides, etc. were all based on local conditions. Insecticides used were Thiodan (endosulfan), Sevin, Furadan 15 G, Diazinon, Pydrin, I Midan, Guthion, Phosphamidan, Monitor. Fungicides used were Difolatan (captafol), Bravo, Maneb, Dithane (M-45), Ridomil, Mancozeb, Manzate. Herbicides used were Sencor, Eptam and Lorox. Vines were killed mechanically and by the chemical diquat and surfactant.

Weather Conditions. Temperatures were very cool in the North, especially in August and September. In South Dakota, August was the fourth coolest month on record. Temperatures were cool in Louisiana during the entire season. Precipitation was almost near normal or above in most states. It was quite wet in the Northern states throughout most of the season. In Kansas it warmed up early and it was cool and moist throughout the season. All in all, it probably was a good season for potato production.

Entries. As in the past, entries were received from Michigan, Minnesota, Nebraska, North Dakota and Wisconsin. Louisiana did not officially enter any selections in the 1986 trial. Line La. 12-59 was planted in five trials; these cooperators used their seed of this line from the 1985 trials.

Total and U.S. No. 1 Yield. Red Pontiac was again the highest yielding entry, however NDT9-1068-11R only yielded an average for all locations of about 9 cwt less than Red Pontiac. This is probably the first entry ever tested in the North Central trial that has come close to Red Pontiac in yielding ability. Naturally the yield between Red Pontiac and NDT9-1068-11R was not significant. Other high yielding entries were MS700-83, MN 12567, MN 12161, ND651-9, Russet Burbank and W948R. Wisconsin produced the highest yield and Louisiana the lowest yield. Yield results are found in North Central Regional Tables 1 and 2.

Percent U.S. No. 1. Wisconsin produced the highest percent U.S. No. 1. Of all entries, Russet Burbank had the lowest and Wisc. 879 the highest percent U.S. No. 1 (North Central Regional Table 3).

Maturity. Norland was the earliest maturing entry while Russet Burbank was the latest. Several entries were reported as being late while in the trial they were found to be more in the early or mid-season class (North Central Regional Table 4).

Percent Total Solids. Line W879, with an overall average of 21.4% solids, was the highest in trial. Other high solid entries were W832, MS704-10 and BN9803-1. The lowest entries in total solids were Norland, Red Pontiac, NDT9-1068-11R. Manitoba reported the highest total solids while

Iowa reported the lowest percent total solids. Percent total solids data is found in North Central Regional Table 5.

Scab Reaction. Nebraska reported the severest scab. Several locations reported little or no scab and some cooperators did not report scab (North Central Regional Table 6).

Summary of Grade Defects. Grade defects varied from location to location. For example, North Dakota had a severe incidence of hollow heart this year. Russet Burbank again had a very serious second growth problem. Certain selections are starred (*) to point out a weakness that selection might have. Grade defects are found in North Central Regional Table 7.

Chip Quality (Color). North Central Table 8 shows the Agtron and color chart for chip quality (color). Four cooperators did not report chip data. The best chippers seemed to be ND860-2, ND651-9, W832, MN 12161, MN 82328, BN 9803-1, W 879, Norchip, MS 700-83 and MS 704-10.

Early Blight Readings. Only six cooperators reported early blight readings (North Central Regional Table 9). Line NE 165.75-2 and the check variety Russet Burbank appeared to be the most resistant to early blight.

Overall Merit Ratings¹. Merit ratings for 1986 are found in North Central Regional Table 10.

For comparison, the following table presents merit ratings for the growing seasons of 1984, 1985 and 1986.

<u>Cultivar or Selection</u>	<u>Total Points</u>		
	<u>1984</u>	<u>1985</u>	<u>1986</u>
ND671-4Russ	0	19	36
NDT9-1068-11R	0	0	24
MS700-83	0	10	23
ND651-9	0	22	19
ND860-2*	15	12	17
W832*	0	0	17

¹ Merit Ratings

<u>Rating</u>	<u>Points</u>	*Tied for fifth place
1	5	
2	4	
3	3	
4	2	
5	1	

North Central Regional Trial Table 1. Total Yield (Cwt/Acre) - 1986.

Cultivar or Selection	Alb.	Man.	IN	IA	KS	KY	LA	MI	MN	MO	NE	OH	ND	SD	WI	Ave.
<u>Early to Medium Early</u>																
Norland	380	182	234	261	209	239	181	376	412	211	269	248	216	178	365	264
ND651-9	506	229	345	420	208	267	201	493	446	246	322	307	255	249	502	333
ND860-2	391	181	371	371	153	284	181	339	410	245	193	303	158	195	371	276
W832	471	208	NS	348	263	189	149	459	ND	239	236	273	242	288	597	305
<u>Medium to Late</u>																
MS700-83	506	213	312	370	266	250	185	541	437	377	303	332	257	329	551	350
MS704-10	478	240	298	285	131	240	118	471	430	352	219	261	207	269	537	302
MN12161	489	211	390	333	216	324	147	485	523	255	270	253	234	286	584	333
MN12567	494	223	358	425	198	289	232	506	534	298	236	236	254	272	706	351
MN82328	323	184	251	272	163	206	150	427	446	187	220	198	204	181	478	259
NE165.75-2	291	258	119	258	137	199	70	453	245	88*	112	173	121*	166	486	212
NEA71.72-1	559	220	416	365	174	158	165	448	ND	166	301	191	237	191	569	277
BN9803-1	356	185	302	355	172	164	130	410	ND	252	171	307	203	146	619	269
ND671-4Russ	407	218	325	350	173	242	157	490	451	215	320	239	233	246	557	314
NDT9-1068-11R	623	325	465	497	125	301	208	593	ND	333	194	361	373	298	658	382
W879	305	188	NS	332	231	238	173	445	ND	279	222	291	186	250	564	284
W948R	521	293	NS	348	196	233	148	655	ND	247	133	229	275	332	692	330
Red Pontiac	609	273	458	426	232	311	210	473	ND	351	387	351	275	295	818	390
Russet Burbank	573	293	320	404	261	225	114	613	ND	236	269	251	251	282	674	340
Norgold Russet	513	212	348	339	184	246	186	347	424	272	236	301	226	189	478	300
Norchip	462	228	358	339	333	288	100	441	444	279	318	332	242	284	461	327
La12-59	624	272	NS	292	NS	NS	NS	NS	NS	NS	NS	NS	284	259	NS	346
Average	470	230	333	351	201	244	160	473	433	256	246	271	234	246	536	311

NS - No seed was received

ND - Seed was sent but cooperators did not report data

* - Only 10 hills/replication. Seed froze in transit resulting in poor stand

North Central Regional Trial Table 2. U.S. No. 1 Yield (Cwt/Acre) - 1986

Cultivar or Selection	Alb.	Man.	IN	IA	KS	KY	LA	MI	MN	MO	NE	OH	ND	SD	WI	Ave.
<u>Early to Medium Early</u>																
Norland	259	159	ND	213	148	214	154	315	381	143	133	230	140	150	341	212
ND651-9	351	182	ND	371	60	205	153	383	384	132	171	246	199	221	457	251
ND860-2	291	148	ND	331	49	242	142	259	365	170	69	268	115	156	317	208
W832	351	184	ND	278	182	173	125	405	ND	185	99	229	190	269	586	250
<u>Medium to Late</u>																
MS700-83	358	167	ND	329	186	202	152	468	395	197	113	263	193	283	514	272
MS704-10	224	195	ND	236	45	190	96	311	378	254	106	214	159	243	497	224
MN12161	372	119	ND	234	22	193	105	361	409	94	129	201	145	197	459	217
MN12567	380	182	ND	402	71	261	158	388	490	190	91	187	173	236	666	276
MN82328	268	147	ND	222	50	140	122	297	392	83	95	174	166	142	416	193
NE165.75-2	107	179	ND	216	45	163	46	390	221	51	41	142	95	153	450	164
NEA71.72-1	428	174	ND	228	73	118	115	361	ND	27	159	155	183	152	516	206
BN9803-1	259	125	ND	289	66	137	100	316	ND	156	70	265	149	108	577	201
ND671-4Russ	329	153	ND	290	91	197	122	311	380	83	164	189	175	164	461	222
NDT9-1068-11R	296	264	ND	442	59	265	182	504	ND	216	85	281	320	280	618	293
W879	168	150	ND	303	177	209	153	377	ND	213	125	225	157	224	545	232
W948R	244	235	ND	286	129	199	101	557	ND	193	57	203	211	280	624	255
Red Pontiac	278	229	ND	376	135	284	171	388	ND	278	196	295	238	274	786	302
Russet Burbank	401	211	ND	218	45	175	63	283	ND	73	135	168	125	201	600	207
Norgold Russet	363	177	ND	262	68	207	149	197	379	151	120	266	143	145	423	217
Norchip	345	174	ND	300	135	257	70	356	409	179	183	256	180	248	439	252
La12-59	383	213	NS	254	NS	NS	NS	NS	NS	NS	NS	NS	241	224	NS	263
Average	307	179	—	289	91	201	123	361	381	153	117	222	176	207	514	234

NS - No seed was received

ND - No data - Seed was sent, however cooperator did not report data

North Central Regional Trial Table 3. Average Percent U.S. No. 1 (over 2" diameter) - 1986

Cultivar or Selection	Alb.	Man.	IN	IA	KS	KY	LA	MI	MN	MO	NE	OH	ND	SD	WI	Ave.
<u>Early to</u>																
<u>Medium Early</u>																
Norland	68	87	ND	82	71	89	85	84	92	68	50	93	65	84	93	79
ND651-9	70	79	ND	88	29	77	76	77	93	54	53	80	78	89	91	73
ND860-2	74	82	ND	89	32	85	79	76	89	69	36	88	73	80	85	74
W832	75	88	ND	80	69	92	84	89	ND	77	42	84	79	93	98	75
<u>Medium to Late</u>																
MS700-83	71	79	ND	89	70	80	82	87	90	71	37	79	75	86	93	77
MS704-10	47	82	ND	83	34	79	81	66	88	72	48	82	77	90	93	73
MN12161	76	56	ND	66	10	60	71	75	78	37	48	79	62	69	79	61
MN12567	77	81	ND	95	36	90	68	77	92	64	39	79	68	87	94	74
MN82328	83	80	ND	81	31	65	81	70	88	44	44	88	81	78	87	71
NE165.75-2	37	69	ND	84	33	79	66	86	90	58	36	82	78	92	93	69
NEA71.72-1	77	79	ND	62	42	75	70	81	ND	16	53	81	78	80	91	68
BN9803-1	73	68	ND	82	38	82	77	77	ND	62	41	86	74	74	93	71
ND671-4Russ	81	70	ND	83	53	81	78	63	84	39	51	79	75	67	83	70
NDT9-1068-11R	47	81	ND	89	47	81	88	85	ND	65	44	78	86	94	94	75
W879	55	80	ND	91	77	88	88	85	ND	76	56	77	85	90	97	80
W948R	47	80	ND	82	66	84	68	85	ND	78	43	89	77	84	90	74
Red Pontiac	46	84	ND	88	58	91	81	82	ND	79	51	84	86	93	96	78
Russet Burbank	70	72	ND	54	17	78	55	46	ND	31	50	67	50	71	89	57
Norgold Russet	71	84	ND	77	37	85	80	57	89	56	50	88	63	77	88	71
Norchip	75	76	ND	89	58	89	70	80	92	64	57	77	75	87	95	77
La12-59	61	78	ND	87	NS	NS	NS	NS	NS	NS	NS	NS	85	86	NS	79
Average	65	77	ND	81	45	81	76	76	88	59	46	82	74	83	91	72

ND - No Data; seed sent but cooperator did not report any data

NS - No seed was received

North Central Regional Trial Table 4. Maturity Classification^{1/} - 1986

Cultivar or Selection	Alb.	Man.	IN	IA	KS	KY	LA	MI	MN	MO	NE	OH	ND	SD	WI	Ave.
<u>Early to</u>																
<u>Medium Early</u>																
Norland	ND	1.0	1.0	1.0	1.5	ND	1.0	1.0	ND	1.0	2.0	1.0	2.0	1.0	1.5	1.3
ND651-9	ND	1.0	2.5	1.0	3.5	ND	3.0	2.0	ND	2.5	3.0	3.0	2.0	1.0	2.0	2.4
ND860-2	ND	1.0	2.5	1.0	2.2	ND	3.0	1.0	ND	2.5	2.5	2.0	2.0	1.0	2.0	2.7
W832	ND	2.5	NR	2.0	4.5	ND	3.0	3.0	ND	3.0	3.0	3.0	2.5	2.0	2.5	2.8
<u>Medium to Late</u>																
MS700-83	ND	2.0	3.5	3.0	3.2	ND	3.0	3.0	ND	3.0	3.0	2.0	3.3	1.0	3.0	2.8
MS704-10	ND	2.0	3.2	3.0	2.5	ND	3.0	3.0	ND	3.0	3.5	3.0	2.8	2.0	3.5	2.9
MN12161	ND	2.5	4.2	3.0	3.8	ND	4.0	3.5	ND	3.5	3.0	3.0	3.3	2.0	3.0	3.2
MN12567	ND	2.0	3.0	3.0	2.5	ND	3.0	3.8	ND	3.0	3.5	3.0	2.5	2.0	3.5	2.9
MN82328	ND	3.0	2.8	3.0	1.8	ND	4.0	3.5	ND	3.5	3.5	3.0	2.3	2.0	3.0	3.0
NE165.75-2	ND	4.5	3.8	3.0	4.3	ND	4.0	4.5	ND	3.5	4.0	4.0	4.8	3.0	3.5	3.9
NEA71.72-1	ND	3.0	3.8	4.0	5.0	ND	2.0	3.5	ND	3.0	3.5	3.0	4.0	3.0	4.0	3.5
BN9803-1	ND	1.0	2.5	3.0	2.0	ND	3.0	3.0	ND	3.0	3.0	4.0	2.3	2.0	4.0	2.7
ND671-4Russ	ND	1.0	3.5	3.0	3.3	ND	4.0	2.8	ND	4.0	3.0	3.0	3.5	1.0	4.0	3.0
NDT9-1068-11R	ND	4.0	3.8	5.0	2.0	ND	5.0	3.2	ND	4.5	4.0	2.0	4.0	2.0	4.0	3.6
W879	ND	3.0	NS	4.0	5.0	ND	4.0	3.0	ND	4.0	3.0	2.0	3.8	3.0	4.0	3.5
W948R	ND	4.0	NS	4.0	3.8	ND	3.0	3.0	ND	3.5	3.5	3.0	4.3	4.0	4.5	3.7
Red Pontiac	ND	3.5	4.0	3.0	4.5	ND	4.0	3.5	ND	3.0	4.0	3.0	3.0	2.0	4.5	3.5
Russet Burbank	ND	3.5	4.2	5.0	5.0	ND	5.0	4.5	ND	5.0	4.0	5.0	5.0	5.0	5.0	4.7
Norgold Russet	ND	1.0	3.2	3.0	2.5	ND	2.0	3.0	ND	3.5	3.0	3.0	2.0	2.0	3.0	2.6
Norchip	ND	2.0	3.2	2.0	3.5	ND	4.0	3.0	ND	3.0	3.5	3.0	2.5	2.0	3.0	2.9
La12-59	NS	3.0	NS	4.0	NS	NS	NS	NS	NS	NS	NS	NS	3.3	2.0	NS	3.1
Average	--	2.4	3.2	3.0	3.3	--	3.4	3.0	--	3.3	3.2	2.9	3.1	2.1	3.4	3.1

1/ 1. Very early - Norland Maturity

2. Early - Irish Cobbler Maturity

3. Medium - Red Pontiac Maturity

4. Late - Katahdin Maturity

5. Very Late - Russet Burbank Maturity

NS - No seed was received

ND - Seed was sent, however cooperator did not report data

North Central Regional Trial Table 5. Percent Total Solids - 1986.

Cultivar or Selection	Alb.	Man.	IN	IA	KS	KY	LA	MI	MN	MO	NE	OH	ND	SD	WI	Ave.
<u>Early to Medium Early</u>																
Norland	16.0	19.3	16.1	10.5	15.2	18.2	15.2	16.5	15.2	16.5	18.6	17.7	18.4	15.8	13.9	16.2
ND651-9	19.9	20.8	16.8	14.8	19.2	21.9	15.2	18.6	18.2	17.7	20.3	19.4	21.6	18.3	17.3	18.7
ND860-2	19.9	21.0	17.7	15.2	18.2	22.8	16.7	18.8	18.2	18.6	19.7	22.8	21.6	18.3	17.3	19.1
W832	21.3	24.8	ND	14.1	19.0	23.0	18.2	19.9	ND	18.2	21.6	22.5	20.3	21.2	20.5	20.4
<u>Medium to Late</u>																
MS700-83	19.8	23.0	17.3	11.6	18.2	21.9	15.6	19.0	19.7	17.3	20.7	22.8	20.9	19.9	17.3	19.0
MS704-10	21.4	23.8	18.8	15.7	16.2	23.6	17.7	20.1	20.7	18.6	22.0	21.7	22.4	20.8	18.8	20.2
MN12161	21.4	24.0	16.6	16.6	17.5	21.5	15.8	19.9	19.0	18.6	20.3	22.1	21.6	19.7	20.1	19.6
MN12567	22.5	22.5	15.5	11.2	15.8	20.1	15.2	18.6	17.5	16.9	22.0	20.4	20.3	18.6	18.4	18.4
MN82328	20.5	23.8	15.5	14.4	18.0	19.3	16.0	19.2	18.2	17.5	20.5	20.9	20.9	18.3	18.0	18.7
NE165.75-2	19.9	23.3	16.9	16.0	17.5	19.3	16.0	19.4	18.6	15.8	20.7	19.0	19.7	18.6	19.0	18.6
NEA71.72-1	18.3	23.5	15.5	13.4	14.5	18.4	15.2	19.4	ND	17.5	21.2	20.6	20.7	22.2	18.6	18.5
BN9803-1	21.8	25.0	18.2	18.1	18.2	22.1	16.9	20.5	ND	18.0	21.4	23.6	16.9	20.1	19.9	20.1
ND671-4Russ	19.8	21.0	15.0	12.4	17.1	19.1	15.2	18.4	16.7	18.0	19.7	19.4	17.5	18.0	16.7	17.6
NDT9-1068-11R	18.3	21.8	14.3	12.2	13.7	18.5	15.2	16.9	ND	15.6	18.0	17.9	18.8	17.3	17.5	16.9
W879	21.8	26.3	NS	14.6	20.7	23.0	16.7	21.8	ND	19.4	22.7	25.1	22.4	22.2	21.2	21.4
W948R	20.8	22.8	NS	14.3	17.7	18.0	15.2	19.9	ND	15.8	19.0	21.3	20.7	19.2	18.8	18.7
Red Pontiac	17.5	21.5	14.2	11.6	13.5	15.6	15.2	17.5	ND	14.5	16.9	18.5	17.5	16.8	16.5	16.2
Russet Burbank	22.3	23.0	16.6	15.1	15.4	20.0	15.2	21.2	ND	17.5	20.7	21.9	20.7	20.5	20.9	19.4
Norgold Russet	19.9	22.0	15.5	13.4	14.8	19.5	15.4	18.2	17.8	17.5	18.6	20.2	18.8	18.6	16.0	17.7
Norchip	20.8	22.5	17.7	15.8	17.1	20.0	16.5	19.9	19.2	17.7	21.6	21.3	21.4	19.5	18.2	19.3
La12-59	21.5	23.8	NS	14.3	NS	NS	NS	NS	NS	NS	NS	NS	21.8	18.9	NS	20.1
Average	20.3	22.8	16.5	14.1	16.9	20.3	15.9	19.2	18.3	17.4	20.3	20.9	20.2	19.2	18.2	18.8

NS = No Seed was received

ND = No data - Seed was sent but cooperators did not report data

North Central Regional Trial Table 6. Scab Reaction Report. Most Representative Scab (Area-Type)^{1/}-1986

Cultivar or Selection	Alb.	Man.	IN	IA	KS	KY	LA	MI	MN	MO	NE	OH	ND	SD	WI
<u>Early to</u>															
<u>Medium Early</u>															
Norland	0-0	T-1	2-2	1-3	1-1	T-1	0-0	0-0	ND	1-1	4-1	0-0	1-1	1-1	0-0
ND651-9	0-0	T-1	2-2	0-0	2-2	T-1	T-1	0-0	ND	1-1	5-4	0-0	T-1	0-0	2-2
ND860-2	0-0	T-1	1-2	0-0	0-0	T-1	T-1	0-0	ND	T-1	5-3	0-0	T-1	2-2	0-0
W832	0-0	T-1	NR	1-1	1-2	T-1	T-1	0-0	ND	1-1	5-2	1-4	T-4	0-0	0-0
<u>Medium to Late</u>															
MS700-83	0-0	T-1	2-2	T-1	1-2	T-2	T-1	1-1	ND	T-1	5-1	0-0	3-3	2-2	0-0
MS704-10	0-0	0-0	2-2	T-1	0-0	T-1	T-1	0-0	ND	1-1	5-2	0-0	T-1	1-0	0-0
MN12161	1-2	0-0	0-0	0-0	0-0	T-1	T-1	0-0	ND	1-1	5-1	0-0	2-1	0-0	0-0
MN12567	0-0	0-0	0-0	0-0	1-2	1-1	T-1	0-0	ND	T-1	2-1	0-0	2-1	0-0	0-0
MN82328	0-0	0-0	2-3	0-0	1-1	T-1	T-1	0-0	ND	1-1	2-1	0-0	T-1	2-3	0-0
NE165.75-2	0-0	0-0	0-0	T-1	1-1	T-1	T-1	0-0	ND	2-3	5-1	0-0	T-1	2-3	2-2
NEA71.72-1	0-0	0-0	0-0	0-0	1-3	T-1	0-0	0-0	ND	1-1	5-1	0-0	0-0	1-1	2-2
BN9803-1	0-0	T-1	1-2	1-1	1-1	T-1	T-1	0-0	ND	1-1	3-1	0-0	3-5	0-0	0-0
ND671-4Russ	0-0	0-0	0-0	T-1	1-1	T-1	T-1	0-0	ND	T-1	2-1	0-0	0-0	0-0	0-0
NDT9-1068-11R	0-0	0-0	3-1	T-2	1-1	T-1	0-0	0-0	ND	1-1	5-2	0-0	T-1	1-1	0-0
W879	0-0	0-0	NS	0-0	1-1	T-1	0-0	0-0	ND	1-1	3-3	0-0	T-1	0-0	2-3
W948R	0-0	T-1	NS	1-1	1-2	1-1	0-0	0-0	ND	T-1	2-1	0-0	1-1	1-0	2-3
Red Pontiac	0-0	T-1	2-2	0-0	2-1	T-1	0-0	1-2	ND	1-1	5-1	0-0	T-1	0-0	2-4
Russet Burbank	1-2	0-0	0-0	0-0	1-1	T-1	0-0	0-0	ND	1-2	2-1	0-0	0-0	0-0	0-0
Norgold Russet	0-0	0-0	0-0	T-1	1-1	T-1	T-1	0-0	ND	T-1	2-1	0-0	0-0	0-0	0-0
Norchip	0-0	0-0	0-0	0-0	1-2	T-1	T-1	0-0	ND	1-1	5-2	0-0	T-3	0-0	1-2
La12-59	0-0	T-1	NS	T-2	NS	NS	NS	NS	NS	NS	NS	NS	T-1	0-0	NS

1/ AREA

TYPE

T = less than 1%

1 = 1-20%

2 = 21-40%

3 = 41-60%

4 = 61-80%

1 = Small, superficial

2 = Larger, superficial

3 = Larger, rough pustules

4 = Larger pustules, shallow eyes

5 = Very large pustules, deep holes

NS - No Seed was sent

ND - No data - seed was sent but
cooperator did not report any data

North Central Regional Trial Table 7. Summary of Grade Defects - 1986.

Cultivar or Selection	External				Total Free of ^{1/} Ext. Defects	Internal				Total Free of Int. Defects
	Scab	Growth Cracks	Second Growth	Sun Green		Hollow Heart	Internal Necrosis	Vascular Discoloration		
<u>Early to Medium Early</u>										
Norland	8.7	3.7	1.1	0.6	87	1.0	1.9	2.1		94
ND651-9	13.3	4.1*	1.5	1.8	57	0.0	1.3	4.0		95
ND860-2	11.9	1.3	2.1	1.4	85	0.9	1.8	1.9		96
W832	13.2	1.2	2.1	4.0*	80	6.4*	1.1	2.2		81
<u>Medium to Late</u>										
MS700-83	19.7*	3.1	1.1	2.8	76	3.1	1.8*	2.5		93
MS704-10	10.8	1.9	1.5	3.6	83	4.0*	0.9	2.2		93
MN12161	12.9	1.5	6.6*	1.9	80	0.1	0.2	2.1		98
MN12567	12.7	2.0	6.6*	1.9	81	0.3	0.4	5.0*		94
MN82328	13.1	0.6	2.5	1.6	84	0.1	0.3	3.6		94
NE165.75-2	13.3	1.0	4.2	1.7	80	0.9	5.3*	5.9*		88
NEA71.72-1	8.6	0.7	5.5*	1.9	84	4.3	5.4*	4.2		82
BN9803-1	12.4	1.9	1.7	3.2	82	4.9*	4.0	3.6		82
ND671-4Russ	4.9	1.7	3.1	0.8	90	5.7*	1.2	1.9		91
NT9-1068-11R	12.2	3.2	1.4	2.1	81	1.1	1.8	5.4*		92
W879	10.5	1.6	4.2	3.1	75	0.9	2.3	2.8		94
W948R	19.6*	3.2	6.4*	0.5	66	0.0	2.2	5.5*		91
Red Pontiac	11.9	1.8	7.5*	1.0	77	4.4*	1.2	4.3		90
Russet Burbank	5.7	3.9	25.1*	0.5	70	5.7*	2.3	4.2		88
Norgold Russet	9.4	1.4	7.7*	0.9	81	3.9	1.7	1.6		93
Norchip	8.9	3.9	5.9*	4.2*	78	0.5	5.2	2.9		90
La12-59	11.2	7.0	1.3	0.3	80	0.4	0.0	6.0		90

¹ Percent normal tubers showing no defects (some individuals have more than one type of defect).

* Possible weakness of cultivar or clone.

North Central Regional Trial Table 8. Chip Quality - 1986

Cultivar or Selection	Alb. 2/	Man. 2/	IN ^{1/}	KY 2/	LA ^{1/}	MI ^{1/}	MO ^{2/}	NE ^{1/}	OH ^{2/}	ND ^{2/}	WI ^{1/}
<u>Early to Medium Early</u>											
Norland	22	28	3.5	48	8.0	2.5	65	6.0	ND	35	6.5
ND651-9	42	55	2.5	65	6.0	2.5	72	2.0	2.0	42	4.4
ND860-2	53	57	1.5	58	3.0	1.0	77	2.0	2.0	45	3.3
W832	48	54	NS	62	4.0	1.5	72	2.0	2.0	43	3.3
<u>Medium to Late</u>											
MS700-83	23	40	2.5	59	4.0	1.0	70	2.0	3.0	39	5.3
MS704-10	30	38	3.0	50	3.0	1.5	60	3.0	ND	38	7.0
MN12161	37	48	2.5	51	4.0	1.5	70	2.0	3.0	44	3.5
MN12567	32	45	4.0	53	8.0	2.5	70	2.0	2.0	40	5.0
MN82328	48	57	3.0	64	5.0	1.5	70	4.0	2.0	44	3.5
NE165.75-2	13	33	3.0	54	8.0	2.5	70	7.0	3.0	34	3.8
NEA71.72-1	17	38	4.5	52	6.0	2.5	72	2.0	3.0	34	4.3
BN9803-1	37	53	1.5	57	5.0	2.0	75	4.0	3.0	42	3.5
ND671-4Russ	24	41	4.0	44	7.0	2.5	65	5.0	3.0	33	5.2
NDT9-1068-11R	12	27	3.0	45	6.0	3.5	65	8.0	3.0	28	7.0
W8791	50	55	NS	59	3.0	2.0	70	2.0	1.0	40	3.4
W948R	24	36	NS	55	4.0	2.5	68	5.0	3.0	31	4.9
Red Pontiac	11	28	4.0	29	8.0	3.5	45	8.0	3.0	24	9.0
Russet Burbank	24	37	4.5	49	7.0	3.0	68	6.0	2.0	33	4.3
Norgold Russet	16	31	5.0	27	8.0	4.0	45	8.0	4.0	29	8.0
Norchip	36	48	2.0	62	4.0	2.0	75	2.0	2.0	45	4.4
La12-59	25	39	NS	NS	NS	NS	NS	NS	NS	40	NS
Average	30	42	3.0	52	5.0	2.3	67	4.1	2.6	37	5.0

ND - No Data - Seed was sent but cooperator did not report data

NS - No seed was received

No data reported from Iowa, Kansas, Minnesota, South Dakota

1/ PCII Color Chart (1 - lightest; 10 - darkest)

2/ Agtron (Highest number lightest)

North Central Regional Trial Table 9. Early Blight^{1/} - 1986.

Cultivar or Selection	Alb.	Man.	IN	IA	KS	KY	LA	MI	MN	MO	NE	OH	ND	SD	WI	Ave.
<u>Early to Medium Early</u>																
Norland	ND	ND	ND	ND	2.5	ND	ND	3.0	1.0	ND	1.0	ND	1.8	ND	2.0	1.9
ND651-9	ND	ND	ND	ND	3.8	ND	ND	3.0	2.0	ND	1.0	ND	2.8	ND	3.0	2.6
ND860-2	ND	ND	ND	ND	3.5	ND	ND	3.0	2.0	ND	1.0	ND	2.0	ND	3.0	2.4
W832	ND	ND	ND	ND	3.0	ND	ND	4.0	ND	ND	2.0	ND	3.3	ND	4.5	3.4
<u>Medium to Late</u>																
MS700-83	ND	ND	ND	ND	3.0	ND	ND	3.7	2.0	ND	2.5	ND	2.5	ND	3.0	2.8
MS704-10	ND	ND	ND	ND	2.8	ND	ND	3.7	2.0	ND	2.0	ND	2.8	ND	1.5	2.5
MN12161	ND	ND	ND	ND	4.0	ND	ND	4.0	2.0	ND	3.5	ND	2.3	ND	3.0	3.1
MN12567	ND	ND	ND	ND	2.8	ND	ND	4.0	1.0	ND	2.5	ND	1.8	ND	3.5	2.6
MN82328	ND	ND	ND	ND	2.0	ND	ND	4.0	1.0	ND	2.5	ND	2.3	ND	2.5	2.4
NE165.75-2	ND	ND	ND	ND	4.5	ND	ND	5.0	4.0	ND	2.5	ND	4.3	ND	3.0	3.9
NEA71.72-1	ND	ND	ND	ND	4.8	ND	ND	4.5	ND	ND	2.5	ND	3.8	ND	1.5	3.4
BN9803-1	ND	ND	ND	ND	2.3	ND	ND	4.0	ND	ND	1.5	ND	2.8	ND	2.0	2.5
ND671-4Russ	ND	ND	ND	ND	3.8	ND	ND	3.7	1.0	ND	1.0	ND	2.5	ND	1.5	2.3
NDT9-1068-11R	ND	ND	ND	ND	2.8	ND	ND	3.5	ND	ND	3.0	ND	3.8	ND	3.0	3.2
W879	ND	ND	ND	ND	4.3	ND	ND	3.7	ND	ND	1.5	ND	3.0	ND	1.5	2.8
W948R	ND	ND	ND	ND	3.3	ND	ND	4.0	ND	ND	2.0	ND	3.8	ND	4.0	3.4
Red Pontiac	ND	ND	ND	ND	3.8	ND	ND	4.2	ND	ND	2.5	ND	3.0	ND	3.5	3.4
Russet Burbank	ND	ND	ND	ND	4.8	ND	ND	4.2	ND	ND	3.0	ND	5.0	ND	4.5	4.3
Norgold Russet	ND	ND	ND	ND	2.8	ND	ND	3.7	2.0	ND	1.5	ND	2.3	ND	3.0	2.6
Norchip	ND	ND	ND	ND	3.0	ND	ND	3.5	2.0	ND	2.0	ND	1.8	ND	2.5	2.5
La12-59	ND	ND	ND	ND	NS	ND	ND	NS	NS	ND	NS	ND	3.5	ND	NS	3.5
Average	--	--	--	--	3.4	--	--	3.8	1.8	--	2.0	--	2.9	--	2.8	2.9

ND - No Data - Seed was sent, however cooperator did not report data
 NS - No Seed was received

¹ Early Blight: 1=susceptible; 5=highly resistant; 0=no disease

North Central Regional Trial Table 10. Merit Ratings^{1/} - 1986

Cultivar or Selection	Alb.	Man.	IN	IA	KS	KY	LA	MI	MN	MO	NE	OH	ND	SD	WI	Total Points
<u>Early to Medium Early</u>																
Norland					3				2							5
ND651-9	1	1				5	1				4		4		3	19
ND860-2			5	3		4	2					3				17
W832	4				4			1		5				2	1	17
<u>Medium to Late</u>																
MS700-83			3		5					4	2	4		5		23
MS704-10								3		2						5
MN12161			4													4
MN12567	2					2	3	4	4			2				12
MN82328									3						2	5
NE165.75-2																0
NEA71.72-1								2			3					5
BN9803-1			1													1
ND671-4Russ	5			5				5	5		5	5	1		5	36
NDT9-1068-11R		5		2			5						5	4		24
W879					2					3	1	1		3		11
W948R		3												3	4	13
Red Pontiac		2														2
Russet Burbank	3															3
Norgold Russet				4					1				2			7
Norchip			2	1	1	1				1				1		7
La12-59	4															4

<u>1 Merit Ratings</u>	
<u>Rating</u>	<u>Points</u>
1	5
2	4
3	3
4	2
5	1

WESTERN REGIONAL POTATO VARIETY TRIAL - 1986

J.J. Pavek, D.L. Corsini, and Cooperators ^{1/}

Uniform Potato Yield Trial

The 1986 trial was grown at eleven locations. It consisted of 12 entries, 10 experimental and three standard checks. The Olton, Texas trial was destroyed by hail and therefore is not included here. Three locations grew all or part of the entries for early harvest. The trial locations, dates of planting, vine killing, and harvest, and days from planting to harvest were as follows:

State	Location	Planting	Vine Kill	Harvest	Days to
		Date	Date	Date	Harvest
California	Kern Co.	2/11	6/4	6/9	118
"	Tulelake	5/7	8/29	9/15	131
Colorado	San Luis Valley	5/14	8/26	9/15	124
Idaho	Aberdeen	5/6	9/22	10/13	165
"	Kimberly-Early	4/30	8/25	8/26	118
"	Kimberly-Late	4/30	9/20	10/8	161
New Mexico	Farmington	4/16	9/25	10/2	169
Oregon	Hermiston-Early	3/28	7/23	8/8	133
"	Hermiston-Late	4/2	9/12	10/6	187
"	Malheur	4/25	---	10/1	159
Texas	Olton	D e s t r o y e d b y h a i l			
Washington	Othello-Early	4/7		8/30	134
	Othello-Late	4/23		9/30	160

Cultural practices and the use of fertilizer, herbicides, pesticides, and vine killing varied according to local conditions. Trial plots at all locations were irrigated on a regular schedule throughout the entire growing season according to plant needs. Late May and June temperatures were much above normal in the northern part of the region while August was below normal. The southern areas were above normal early and normal later.

Data on vine and tuber characteristics, yield, internal quality disease reactions, and merit scores are presented in Western Tables 1 through 7. Long russet A7411-2 had the highest merit score while A76147-2, a possible replacement for Kennebec, was second. A7411-2 is similar to Russet Burbank but higher in solids. A7411-2, A74114-4, and TC582-1 have been in the trial three years and therefore will be dropped. A76147-2, A79141-3, AC79100-1, and C008014-1 will be repeated in this trial in 1987. A79141-3 appears to have excellent internal quality for french frying.

^{1/} California, R. Voss, T. Smith; Colorado, D. Holm; Idaho, S. Love, G. Kleinschmidt; New Mexico, E.J. Gregory; Oregon, A. Mosley, D. Hane, C. Stanger; Texas, D. Smallwood, C. Miller; Washington, R. Thornton, W. Iritani, M. Martin.

Western Table 1. Seed source, stand, vine characteristics, and foliar diseases. 1/

Entry	Seed Source	Stand % (4 loc)	Vine Size	Maturity	Vert Wilt		Early Blight	
					ID	WA	ID	WA
<u>Full Season</u>								
A7411-2	ID	90	MLrg	MI.	MS	MS	MS	MR
A76147-2	ID	86	MLrg	Med	MS	MS	MS	--
A79141-3	OR	92	MLrg	ML	--	S	--	S
AC79100-1	CO	86	Lrg	MI.	MS	S	MS	S
A7267-3	CA	82	Med	Med	S	S	MS	S
C008014-1	OR	86	MLrg	ML	-	MS	-	-
TC582-1	OR	84	Lrg	Late	MS	S	MR	VS
Lemhi Russet	OR	88	MLrg	MI.	S	S	S	VS
Russet Burbank	OR	88	MLrg	ML	S	S	MS	S
<u>Early</u>								
A74114-4	ID	89	Med	ME	S	S	S	S
ND534-4Rus	OR	88	Sm	E	VS	VS	S	VS
A76260-16	ID	85	Med	E	VS	VS	S	S
Norgold Russet	OR	87	Med	ME	VS	VS	VS	VS

1/ M, Med = medium, Lrg = large, Sm = small, ML = medium large, ME = medium early, E = early, R = resistant, S = susceptible, MR = moderately resistant, MS = moderately susceptible, VS = very susceptible.

Western Table 2. Total tuber yield, cwt/acre. Full season and early harvests.^{1/}

Entry	California		Colo	Idaho		Oregon		Wash		N.Mex.	Overall
	Krn	Tul	SLV	Ab	Kim ^{2/}	Hrm	Mal	Oth	Frm	Mean	
A7411-2	350	505	366	432	442 (462)	624 (371)	528	655	377	465	
A76147-2	390	540	408	537	359 (488)	853 (530)	742	---	382	523	
A79141-3	355	420	310	525	460 (520)	618 (310)	616	520	326	453	
AC79100-1	255	495	349	426	330 (472)	474 (264)	579	503	369	411	
AD7267-3	245	325	246	316	289 (313)	486 (320)	393	500	202	330	
C008014-1	340	510	283	430	376 (490)	722 (392)	590	619	339	463	
TC582-1	335	445	284	362	160 (387)	425 (316)	481	470	403	370	
Lemhi Russet	360	510	304	482	337 (459)	606 (374)	492	--- (444)	421	435	
Russet Burbank	299	460	318	475	455 (475)	599 (386)	593	653 (429)	473	468	
A74114-4	285	410	253	335	388 (369)	673 (408)	448	---	353	382	
ND534-4Rus	295	420	207	390	260 (362)	620 (381)	511	--- (591)	220	387	
A76260-16	255	510	256	407	438 (466)	690 (402)	615	---	208	425	
Norgold Russet	365	450	250	361	281 (475)	581 (446)	514	--- (575)	201	409	
Location Means	318	462	295	421	352 (441)	613 (372)	546	560 (510)	321	425	

^{1/} Early harvest values are shown in parentheses ().

^{2/} Kimberly late harvest was in a field of lower fertility than the field with the early harvest plots.

Western Table 3. U.S. No. 1's, percent of total yield for locations; overall mean, percent, and cwt/acre. 1/

Entry	California		Idaho		Oregon		Wash		N. Mex		Mean	
	Krn	Tul	Colo SLV	Ab	Kim	Hrm	Mal	Oth	Frm		% cwt/A	
A7411-2	94	90	83	91	88 (88)	72 (71)	73	80	64		81	376
A76147-2	99	90	90	93	88 (82)	71 (78)	77	--	48		80	418
A79141-3	95	76	63	87	82 (82)	74 (53)	70	68	75		75	341
AC79100-1	94	88	83	92	84 (88)	87 (71)	82	86	63		84	345
AD7267-3	90	62	50	89	90 (86)	76 (47)	76	66	68		73	240
C008014-1	97	94	78	91	87 (89)	88 (82)	81	81	67		85	395
TC582-1	95	90	87	89	81 (69)	88 (64)	79	87	68		82	302
Lemhi Russet	96	87	73	92	88 (84)	93 (81)	76	-- (88)	79		86	372
Russet Burbank	83	84	61	83	68 (59)	59 (50)	70	63 (70)	69		70	326
A74114-4	94	90	80	83	78 (76)	83 (78)	84	--	85		87	334
ND534-4Rus	96	93	78	89	82 (84)	87 (79)	85	-- (88)	75		86	334
A76260-16	95	87	87	94	84 (90)	81 (81)	83	--	81		86	365
Norgold Russet	97	95	78	89	86 (85)	79 (79)	75	-- (90)	83		85	349
Location Means	94	87	77	90	85 (82)	79 (71)	78	76 (85)	70		81	346

1/ See Western Table 2 footnotes.

Western Table 4. U.S. No. 1's over 10/12 oz, percent of total yield for locations; overall mean, percent, and cwt/acre. ^{1/}

Entry	California		Colo		Idaho		Oregon		Wash		N.Mex		Mean	
	Krn	Tul	SLV	Ab	Kim	Hrm	Mal	Oth	Frm	% cwt/A				
A7411-2	6	50	30	22	39 (24)	44 (24)	45	54	23	34	157			
A76147-2	31	55	52	56	56 (35)	40 (28)	58	--	45	45	237			
A79141-3	3	18	6	12	16 (13)	17 (2)	31	14	5	14	63			
AC79100-1	6	40	30	48	34 (25)	36 (6)	58	42	27	35	145			
AD7267-3	2	6	2	15	36 (18)	31 (16)	50	27	14	22	73			
CO08014-1	22	44	19	24	19 (14)	46 (13)	59	41	21	33	151			
TC582-1	3	22	27	33	9 (2)	13 (6)	44	41	17	22	81			
Lemhi Russet	3	26	16	31	31 (24)	53 (16)	53	-- (39)	14	30	130			
Russet Burbank	2	25	8	9	20 (9)	5 (2)	21	26 (13)	12	14	63			
A74114-4	4	38	10	20	33 (19)	35 (9)	64	--	4	33	126			
ND534-4Rus	2	45	11	19	15 (12)	51 (16)	42	-- (41)	3	29	111			
A76260-16	2	51	31	22	44 (33)	56 (29)	58	--	7	39	167			
Norgold Russet	4	36	7	23	23 (20)	26 (9)	54	-- (43)	7	26	107			
Location Means	7	36	21	26	29 (20)	36 (14)	49	36 (35)	17	27	116			

^{1/} See Western Table 2 footnotes.

Western Table 5. Specific gravity of tubers. 1/

Entry	California		Colo	Idaho		Oregon		Wash		N.Mex.	Overall Mean
	Krn	Tul	SLV	Ab	Kim	Hrm	Mal	Oth	Frm		
A7411-2	1.094	1.088	1.094	1.097	1.096 (89)	1.086 (91)	1.099	1.075	1.089	1.091	
A76147-2	94	84	93	82	88 (82)	76 (79)	88	--	83	84	
A79141-3	98	94	96	93	95 (90)	88 (91)	00	80	89	93	
AC79100-1	98	81	94	88	86 (79)	77 (80)	90	71	84	84	
AD7267-3	90	84	81	85	86 (83)	76 (87)	86	67	87	83	
C008014-1	91	84	88	88	92 (80)	81 (87)	88	71	84	85	
TC582-1	03	90	00	96	93 (92)	91 (98)	99	82	89	94	
Lemhi Russet	00	90	95	92	94 (91)	87 (93)	95	-- (86)	88	92	
Russet Burbank	94	90	87	88	92 (83)	81 (80)	89	75 (81)	83	86	
A74114-4	98	90	90	86	89 (84)	78 (84)	90	--	87	87	
ND534-4Rus	89	78	78	76	79 (77)	68 (77)	79	-- (79)	73	78	
A76260-16	93	83	84	80	81 (76)	70 (78)	82	--	75	80	
Norgold Russet	86	80	88	79	80 (75)	75 (81)	74	-- (79)	76	80	
Loc Mean	1.094	1.086	1.090	1.086	1.089 (83)	1.080 (85)	1.089	1.074 (81)	1.084	1.086	

1/ See Western Table 2 footnotes.

Western Table 6. External and internal defects, french fry color, sugars, and vitamin C, and TGA.

Entry	U.S. No.2 & Culls >4 oz	Common Scab (Ab)	Shatter Bruise 1/	Hollow heart %	Black- spot 2/	Fry Color		Glucose YSI (DWB)	Vit. C mg/100 g Fresh	TGA4/ mg/100 g Fresh
						ID	CO			
						450	450			
3/										
A7411-2	12	S	1.1	<1	2.8	1.5	2	0.5	30.0	4.8
A76147-2	12	S	1.3	5	2.0	1.7	2	0.8	25.8	6.1
A79141-3	11	--	1.7	15	2.8	0.7	1	0.3	14.1	4.7
AC79100-1	7	R	2.5	15	2.6	1.5	4	0.6	24.5	2.4
AD7267-3	16	R	2.2	5	3.0	1.8	3	0.4	23.4	3.3
C008014-1	7	--	1.7	5	2.8	1.1	1	0.3	23.5	6.0
TC582-1	4	VR	1.5	4	1.5	1.1	3	0.3	30.1	1.9
Lemhi Russet	8	VR	1.5	14	3.4	1.4	3	0.4	25.4	6.1
Russet Burbank	20	R	0.7	5	2.0	1.2	2	0.5	18.4	5.0
A74114-4	8	R	0.4	4	1.3	2.4	3	1.1	26.4	9.8
ND534-4Rus	5	R	0.5	8	1.4	2.0	3	0.9	18.4	3.4
A76260-16	10	MS	0.9	6	3.0	1.1	2	0.4	28.5	3.5
Norgold Russet	5	R	0.8	19	1.7	2.3	--	0.8	26.3	3.6

1/ Mean of 5 locations, 0 (none) to 5.0 (severe).

2/ Mean of 6 locations, 1.0 (lightest) to 5.0 (darkest).

3/ French fry color: USDA standard chart, 00 (0.1) (lightest) to 4.0 (darkest), fried in December.

4/ Glucose, Vitamin C, and TGA (total glycoalkaloids) - Aberdeen tubers analyzed at Aberdeen.

Western Table 7. Tuber type and merit rating scores.

Entry	Tubers1/ Shape Skin		California		Colo		Idaho		Oregon		Washington		N.Mex.		Total Merit Score
			Krn	Tul	SLV	Ab	Kim	Hrm	Mal	Oth	Pro	P	Frm		
A7411-2	L	Rus	2	5	4	4	5	-	-	-	-	5	3		28
A76147-2	0	Buff	5	-	5	-	-	2	N	N	-	4	-		16
A79141-3	0	Rus	-	-	-	3	3	-	0	0	-	-	-		6
AD7267-3	0	Rus	-	-	-	-	-	-	T	T	-	-	1		1
AC79100-1	0	Rus	-	-	2	-	-	-	•	•	1	-	-		3
C008014-1	0	Rus	4	4	-	1	-	4	•	•	-	-	-		13
TC582-1	0	Rus	-	-	3	-	-	3	S	S	-	-	2		8
Lemhi Russet	L-0	Rus	-	-	-	5	2	5	C	C	-	3	-		15
Russet Burbank	L	Rus	-	-	-	-	-	-	0	0	2	2	-		4
A74114-4	0-L	Rus	1	-	-	-	1	1	R	R	5	-	4		12
ND534-4Rus	L	Rus	3	3	-	-	-	-	E	E	4	-	-		10
A76260-16	0	Rus	-	1	1	2	4	-	D	D	-	-	-		8
Norgold Russet	0	Rus	-	2	-	-	-	-	-	-	3	-	5		10

1/ Shape: 0=oblong, L=long, R=round; Skin: Rus=russet.

2/ F = fresh market use, P = processing use.

CALIFORNIA

R. E. Voss and J. T. Smith

In 1986, first-year, single-hill, 5-hill, 12-hill, 2 replicatons of 20-hill, and 4 replications of 27-hill trials were conducted (in conjunction with the Western Regional Trial) at two locations - Kern County and Tulelake Basin. In addition, small replicated trials (11 - 13 entries) were conducted in Riverside County, Santa Maria Valley and in Humboldt County. Approximately 25 grower strip trials were grown in Kern, Santa Maria, Stockton Delta, Humboldt, Butte Valley, and Tulelake areas. Seed increase blocks were grown in the Tulelake and Stockton Delta areas.

Seedling Selection

First-year seedlings, all from Idaho, were grown and selected only at Tulelake in 1986. A total of 5,400 seedlings were planted; 181 were selected, a 3.3 percent selection rate. There were 41 families planted; 38 had at least one selection. The family with the highest selection rate had parents of A75188-3 and ND534-4 (10 percent). Parents with the most progeny selected were A7946-10 (38), ND534-4 (26), and A76260-16 (25). Parents with the highest percentage of progeny selected were A7411-2 (8.1 percent), A7961-1 (7.1 percent), and A77182-1 (7.0 percent).

The selections for twelve- and five-hill plots were made in Kern County and at Tulelake from various origins: Idaho (A), North Dakota (ND), California (B, SD, and UC), Idaho/California (AD), North Dakota/California (NDD), and Colorado/California (CD). Parents with progeny most often selected included A7637-8, WD641-10, NDD277-2, A74133-1, A7816-14, Nemhi, NDT8-666-1 Rus, ND534-4, Redsen, and ND1196-2R.

Advanced Selections

Nematode-free seed was available for all entries in 1986. Trials were conducted in six growing areas. Grower strip trials of various sizes were grown in 25 locations. The four varieties named at the end of 1985--Calgold (AD7267-1), Sierra (AD7377-1), Tejon (NDD47-1), and Ute (WC285-18)--were grown in various acreages. Seed for AD7267-1 and AD7377-1 continues to be very limited, but interest is moderately high. After receiving mixed commercial results in 1985, NDD47-1 was grown in moderate acreages in 1986 with a higher level of success. Long dormancy and good storage are qualities of NDD47-1, but young seed requires a long growing season. As a late season russet in Kern County, WC285-18 continues to have a production and marketing niche.

The Kern County growing season was unusually warm and early, and harvest schedules were earlier than planned. Market prices and demand were also good early in the season, and thus the commercial field in which the UC-CPRAB trials were being conducted was prepared for harvest approximately two weeks before the planned vine killing time. Consequently, most

entries were immature, and yields were low. Total yields of the 50 russet entries in the replicated yield trial ranged from 155 cwt/A (WC285-18) to 455 cwt/A (AC79128-1), with an average of 300 cwt/A. The 10 long white entries ranged from 245 cwt/A (AD7386-1) to 425 cwt/A (A76147-2), with an average of 345 cwt/A. The 25 chipper entries ranged from 265 cwt/A (NDD1492-2) to 440 cwt/A (AD79240-6), with an average of 345 cwt/A. The 10 red entries ranged from 255 cwt/A (Sangre) to 365 cwt/A (Red La Soda), with an average of 320 cwt/A. The top overall yield and quality russets were AC79128-1, AD7267-1, A74212-1, C008014-1, and C08011-5. The top overall long whites were A76147-2, BC0038-1, and NDD47-1. The top overall chippers were AD79240-6, MS700-83, Rosa, NY71, and NY82. The top red entry, was NDTX8731-1R, despite its low yield, all other reds had fair to poor color and/or internal necrosis. Other acceptable reds were Chieftain, Sangre 14, Sangre 11, and AD79537-3R.

Specific gravity was unusually high due to early warm temperatures followed by cool temperatures and the early harvest. Many specific gravities exceeded 1.100. Kennebec, the standard chipper, had a specific gravity of 1.094.

Of the 14 Western Regional Trial entries, the top five in Kern County were A76147-2, Shepody, ND534-4, A74114-4, and A7411-2. At Tulalake, the top entries were A7411-2, C008014-1, ND534-4, Norgold Russet, and Russet Burbank.

The growing season at Tulalake was excellent, with a minimum of problems. Vines were killed after 115 days because earliness is an important criterion in this potentially short growing season area. Yields ranged from very good to poor. Total yields of the 55 russet entries ranged from 250 cwt/A (NDD1806-2) to 595 cwt/A (AD74135-1), with an average of 435 cwt/A. The 16 chipper entries ranged from 145 cwt/A (ND258-1) to 635 cwt/A (NDD1784-5), with an average of 485 cwt/A. The seven long white entries ranged from 265 cwt/A (AD74548-5) to 540 cwt/A (A76147-2), with an average of 460 cwt/A. The seven red entries ranged from 340 cwt/A (NDA1550-1) to 530 cwt/A (Chieftain), with an average of 445 cwt/A. The top overall and quality russets were A74212-1, AD74135-1, NDD837-2, AD7267-1, and A7411-2. The top overall chippers were NDD1784-5, Rosa, and COA7919-4. The top overall long whites were NDD47-1 and A76147-2. The top reds were Chieftain and NDTX8731-1R.

Results from the 2X20 trials (the first year of small replicated yield trials) in Tulalake and Kern County revealed several potentially excellent selections. Russets in Kern

County ranged in total yield from 490 cwt/A (A80615-2) to 85 cwt/A (Nooksack). The top overall russets were A80615-2, NDD1258-1, and NDA848-3. At Tulalake, the russets ranged in total yield from 590 cwt/A (NDD2135-10) to 220 cwt/A (A7961-5). The top overall russets were AD81323-5, AD81324-4, and CD80132-1. Chippers in Kern County ranged in total yield from 595 cwt/A (B4-6) to 205 cwt/A (B205). The top overall chippers were AD80481-5 and COA7919-4; many of the top yielders were unacceptable because of deep eyes or very small tuber size. Specific gravity was high, ranging from 1.105 (COA7919-4) to 1.079 (AD80434-2). Nearly all entries chipped well at harvest, but none of them chipped well after cold storage. At Tulalake, chippers ranged in yield from 760 cwt/A (NDD2007-1) to 180 cwt/A (PAS2915); the top overall chippers were NDD2007-1, B13-3 (yellow flesh) and AD79491-1. Several of the "B" lines produced well at Kern and/or Tulalake; these are heat tolerant selections with parentage partially from species not cultivated in the United States. The 2X20 long white selections in Kern County ranged in total yield from 520 cwt/A (Kufpri Jyoti, a variety from India) to 145 cwt/A (UC204). Several selections of NDD47-1 were grown but produced poorly because all were from Delta seed sources, and NDD47-1 requires too long of a dormancy period to be planted early in Kern County and followed by an early harvest. No long whites emerged from the Kern County 2X20 trials with high potential. At Tulalake, one long white that chipped well was B15, with a total yield of 625 cwt/A.

Yields at the Riverside County trial were generally unacceptably low due to soil and water limitations. As a result, any conclusions from this trial would be risky. Some useful information, however, was that three varieties--AD74135-1, A74212-1, and AD77187-7--were susceptible to heat sprouting; and White Rose and AD7386-1 were susceptible to second growths.

Production at Santa Maria was excellent. Total yields ranged from 745 cwt/A (AD74135-1) to 345 cwt/A (NDD666-2). The top overall entries, all russets, were AD7377-1, AD7267-1, and Russet Burbank. Continuing to show promise is A74133-1, but it is easily skinned; A74212-1 was somewhat pointed and moderately susceptible to blackspot.

Production at Humboldt County was outstanding, with Chippers yielding from 725 (Kennebec) to 440 (ND860-2). Specific gravity was somewhat lower than in previous years, ranging from 1.080 (ND258-1) to 1.093 (AD77187-12), but chip color was excellent, as usual. The top chipping entries overall were

Kennebec, AD77187-7, and AD77187-12. Chieftain and Calgold also performed well at Humboldt, with total yields of 730 and 590 cwt, respectively.

The most promising advanced selections that have been tested in several locations for several years and/or appear to have the most current commercial promise include:

A7411-2. This light/medium, long oval russet variety is high-yielding with a medium maturity and is adaptable to northern and possibly southern California.

A74133-1. Another light russet, this variety is oblong to long oval and has a very high-yielding potential in both northern and southern California. It has good storage, long dormancy, and medium-late maturity.

AD7430-1. A heavy russet, this long oval variety has medium-to high-yield and potential in northern California.

AD7818-5. Another heavy russet, this very attractive long blocky, medium-yield variety is moderately susceptible to internal discoloration and has potential for success in both northern and southern California.

ND534-4. This medium russet variety is early-maturing and susceptible to early dying diseases. It has a medium yield with a wide geographical range of interest and will probably be named and released by North Dakota.

TC582-1. This heavy russet may be named and released by Colorado. It is oblong oval, sometimes roundish, and has a fair to good yield and some alligator skin.

AD77187-7. A good yielding round white chipper, this variety yields somewhat less than Kennebec. It has high specific gravity and good chip color, better than Kennebec.

AD77187-12. This round buff chipper has good yield, slightly less than Kennebec. It has excellent specific gravity and good chip color that is equal to or better than "Dash 7."

A76147-2. An excellent yielding long white, this variety yields higher than White Rose. It is shaped somewhat irregularly but is less susceptible to roughness and skinning. It has an early maturity with larger tubers.

NDTX8731-1R. This round red variety has excellent color, minimal internal necrosis, and a low yield.

Seed Increase Program Virus-tested clone lots previously grown in Big Valley were increased in the Stockton Delta. Tuber units were used to increase all entries at Tulelake. In addition, approximately 20 clones were grown from tissue culture and transplanted into the Stockton Delta.

Several tons of seed tubers were made available for commercial seed and market growers. Approximately 25 growers took advantage of this opportunity and grew various sizes of strip trials. Virus contamination continues to be a limiting factor in the seed increase program.

California Table 1. 1986 Potato Variety Trials Summary of Yield, Quality, and Characteristics of Standard and Potential Varieties

RUSSETS:

<u>CLONE:</u>	<u>LOCATION</u>	<u>TOTAL</u>	-----# 1'S-----			2'S &		% #1'S
			<u>TOTAL</u>	<u>>10 OZ</u>	<u>4-10 OZ</u>	<u>CULLS</u>	<u>B'S</u>	
A69870-10	T,K,SM	335	300	55	245	15	25	90
A7411-2	T,SM,K	455	400	165	235	30	20	89
A7411-2(WRT)	T,K	430	395	135	260	20	10	92
A74114-4	T,K	345	310	100	210	15	20	91
A74114-4(WRT)	T,K	350	320	80	235	10	15	92
A74212-1	T,K,SM,R	440	390	160	235	20	30	86
A74133-1	T,K,SM,R	380	330	85	240	15	30	84
A7532-1	T,K	345	300	40	255	15	30	87
A76260-16	T,K	380	345	130	210	30	10	91
A7735-1	K	205	185	5	180	5	15	89
A77188-1	T	295	220	110	110	25	50	74
A7811-16	T,K	340	315	90	225	10	15	93
A7869-19	T	245	200	80	120	15	25	82
A79108-3	T	505	430	230	200	45	30	86
A79135-3	T	420	370	185	185	35	15	88
A79141-3	T,K	390	330	40	285	10	45	86
A79172-6	T	415	360	155	205	20	35	87
A79249-5	T	450	400	115	285	10	45	88
A79252-6	T	440	385	140	245	10	45	88
A7955-2	T	415	355	155	200	15	45	86
A79141-3 (WRT)	K	355	340	10	325	5	10	95
A80570-4	T	500	435	95	340	15	50	87
A80615-2	T	540	480	155	325	25	30	90
AC77101-1	K	300	290	35	250	5	5	97
AC77226-10	K	195	180	30	150	0	15	92
AC77226-13	K	165	150	15	135	5	10	92
AC77513-1	T,K	325	280	70	210	15	20	90
AC77652-1	K	185	175	5	170	0	10	95
AC77669-1	K	365	345	80	265	15	5	94
AC79100-1	T	375	340	110	230	20	20	91
AC79128-1	K	455	420	55	370	20	10	93
AC8042-5	K	395	385	45	340	0	10	97
AC80363-1	K	345	320	15	305	10	15	92
AC80369-1	K	350	330	20	305	10	10	94
AD7267-3	T,K,SM	350	280	40	240	15	60	79
AD74135-1	T,K,SM,R	485	405	140	260	50	35	82
AD7430-1	T	475	410	110	300	15	50	86
AD7818-5	T,K	380	340	90	260	15	20	92
AD7958-4	T,K	380	340	130	210	15	25	92
AD80472-1	T	410	375	110	265	10	25	92
BC8370-4	K	245	235	15	225	0	10	96

RUSSETS, continued:

CLONE:	LOCATION	TOTAL	-----# 1'S-----			2'S & CULLS	B'S	% #1'S
			TOTAL	>10 OZ	4-10 OZ			
CO7916-3	K	320	295	90	210	15	5	93
CO8011-5	K	330	315	50	270	10	5	96
CO8014-2	K	185	160	0	160	20	10	85
CO8048-1	K	310	300	65	235	5	5	96
CO08014-1	T,K	425	400	150	250	15	10	95
ND435-12	T	375	335	85	250	15	30	89
ND534-4	T,K, SM, R	270	240	50	190	10	25	89
ND534-4 WRT	T,K	360	340	100	240	5	15	94
NDA1441-2	T	390	360	230	135	20	10	92
NDD666-2	T,K, SM	305	260	55	205	20	25	86
NDD837-2	T	565	505	220	285	20	35	90
NDD843-1	T	325	285	160	120	15	25	87
NDD1258-1	T	475	405	215	185	25	45	85
NDD1372-5	T	355	280	125	155	45	30	79
NDD1806-2	T	250	170	45	130	30	50	68
NDD1842-1	T	410	320	65	255	45	45	78
NDD1965-3	T	430	375	145	230	20	35	88
TC582-1-	T,K	400	370	55	315	5	20	93
TC582-1 (WRT)	T,K	410	370	75	300	15	20	91
TND329-1	K	280	265	55	210	0	15	94
UCR1-18	K	370	330	50	280	40	5	88
CALGOLD-A	T,K, SM, R	410	360	155	130	25	20	85
CALGOLD-B	T,K, H	465	415	175	240	25	25	89
CENTENNIAL	K, H	290	275	65	210	0	15	93
LEMHI	T,K	410	390	140	255	15	5	95
LEMHI (WRT)	T,K	435	395	70	325	15	25	92
NORGOLD	T,K, R	325	280	70	205	15	35	83
NORGOLD (WRT)	T,K	410	390	90	305	0	15	96
NORKING	T,K	280	250	30	225	10	20	91
RUS.BURBANK	T, SM	540	415	150	266	90	35	78
R.B. (WRT)	T,K	380	300	65	230	45	40	92
SIERRA-A	T,K, SM	475	435	160	270	25	15	93
SIERRA-B	T	480	430	85	350	15	30	90
UTE	T,K	220	190	35	155	10	15	90

LONG WHITES:

CLONE:	LOCATION	TOTAL	-----#1'S-----		2'S & CULLS	B'S	% #1'S	
			TOTAL	>10 OZ				4-10 OZ
A76147-2	T,K	505	465	270	200	25	10	92
A76147-2 (WRT)	T,K	465	435	210	225	25	5	93
AD7386-1	T,K,R	265	205	80	125	35	25	77
AD74548-5	T,K,R	225	180	45	135	5	35	80
AD79240-2	K,T	395	360	55	300	5	30	92
BC0038-1	K	395	370	50	325	15	10	94
TEJON-A	K,R	215	190	40	150	5	25	76

LONG WHITES, continued:

<u>CLONE:</u>	<u>LOCATION</u>	<u>TOTAL</u>	-----#1'S-----		<u>2'S &</u>		<u>%</u>	
			<u>TOTAL</u>	<u>>10 OZ</u>	<u>4-10 OZ</u>	<u>CULLS</u>	<u>B'S</u>	<u>#1'S</u>
TEJON-B	K	290	280	65	210	5	10	96
W. ROSE-A	K,R	265	220	60	160	30	15	74
W. ROSE-B	K	375	355	100	250	20	5	93

REDS:

<u>CLONE:</u>	<u>LOCATION</u>	<u>TOTAL</u>	-----#1'S-----		<u>2'S &</u>		<u>%</u>	
			<u>TOTAL</u>	<u>>10 OZ</u>	<u>4-10 OZ</u>	<u>CULLS</u>	<u>B'S</u>	<u>#1'S</u>
AD79537-3R	T,K	370	340	55	290	5	30	92
NDTX8731-1R	T,K	340	325	95	230	5	15	95
CHIEFTAIN	T,K,H	535	515	150	365	5	20	96
NEW NORLAND	K	345	345	155	230	0	0	99
RED LA SODA	T,K	440	410	165	245	25	10	93

REDS continued:

<u>CLONE:</u>	<u>LOCATION</u>	<u>TOTAL</u>	-----#1'S-----		<u>2'S &</u>		<u>%</u>	
			<u>TOTAL</u>	<u>>10 OZ</u>	<u>4-10 OZ</u>	<u>CULLS</u>	<u>B'S</u>	<u>#1'S</u>
SANGRE	K	255	245	5	240	5	5	94
SANGRE 10	K	350	335	30	310	0	15	96
SANGRE 11	K	330	315	10	305	0	10	97
SANGRE 14	K	315	305	25	270	0	10	97
SANGRE S	K	320	305	15	290	0	10	96

CHIPPERS:

<u>CLONE:</u>	<u>LOCATION</u>	<u>TOTAL</u>	-----#1'S-----		<u>2'S &</u>		<u>%</u>	
			<u>TOTAL</u>	<u>>10 OZ</u>	<u>4-10 OZ</u>	<u>CULLS</u>	<u>B'S</u>	<u>#1'S</u>
A78100-4	K	340	315	75	245	20	5	93
AB-1	K	310	305	35	270	5	5	98
AC77513-1	K	335	315	95	220	20	5	93
AC80545-1	K	355	345	45	305	0	10	97
AD77187-7	T,K,R,H	415	370	145	295	20	25	89
AD77187-12	T,K,R,H	410	365	80	285	15	30	89
AD79240-6	T,K	480	455	70	390	5	20	95
AD79249-8	K	280	265	15	250	5	5	95
AD79491-1A	K	410	405	60	345	0	10	98
AD79491-1B	K	350	345	40	305	0	5	98
COA7919-4	T	615	590	325	265	15	55	96
MS700-83	K	435	420	95	325	5	10	97
ND258-1	T,K,H	295	270	120	150	15	10	92
ND860-2	K,R,H	285	225	0	220	0	55	79
NDD277-2	T,K,H	450	425	175	245	15	15	94
NDD1338-7	K	270	265	10	255	0	10	97
NDD1492-2	K	265	250	80	170	10	5	94
NDD1687-6	T	340	300	35	265	15	30	88
NDD1696-6	T	410	340	80	265	15	45	85

CHIPPERS, continued:

CLONE:	LOCATION	TOTAL	-----#1'S-----			2'S & CULLS	B'S	% #1'S
			TOTAL	>10 OZ	4-10 OZ			
NDD1728-2	T	475	430	30	400	10	33	91
NDD1784-5	T	635	595	285	310	20	20	94
NDD1821-3	T	415	365	75	295	15	30	89
NDD1821-5	T	560	530	235	290	20	10	94
NY71	K	385	380	50	330	0	5	99
NY72	K	350	330	25	305	10	15	94
NY81	K	300	295	60	235	0	5	98
NY82	K	385	375	15	360	0	10	98
TXA763-5	T	460	435	140	295	10	15	95
KENNEBEC	T,K,H	535	495	265	235	30	10	93
SHEPODY	K,H	425	400	185	220	15	15	94
ROSA	T,K,H	550	500	90	470	10	35	91

LOCATION:	PLANTING DATE:	HARVEST DATE:
K = Kern Co.	Feb. 11	June 9
R = Riverside	Mar. 28	Aug. 5
SM = Santa Maria	Apr. 24	Sept. 15
T = Tulelake	May 7	Sept. 15
H = Humboldt Co.	May 26	Oct. 7

COLORADO

D. G. Holm and M. K. Thornton

Breeding Program

In 1986, thirty parental clones were intercrossed. Seeds from 238 combinations were obtained. Grown in the greenhouse, sixty seedling families produced 8,977 tubers for initial selection in 1987. Surplus tubers were distributed to Idaho, Oregon, Minnesota and Texas.

Seedling tubers were obtained from Dr. J. J. Pavsek, Aberdeen, Idaho, and Dr. J. Creighton Miller, Lubbock, Texas.

Selection Program

A total of 49,640 first-year seedlings were planted, with 452 being selected for further observation. Another 802 were in various stages of preliminary and intermediate testing. One hundred sixty of these clones were saved for further evaluation. Advanced selections of 18 (13 russets, 4 chippers, and one long white) were saved and will be increased. Another 83 potato clones were maintained for breeding and other experimental purposes.

Advanced Yield Trial. A total of 22 clones, 18 advanced selections and four cultivars, were included in the advanced yield trial. Data collected on yield, grade, specific gravity, stand, vine maturity, tuber shape and skin type are summarized in Table 1.

A total of four russets had greater total and US No. 1 yields than Centennial Russet and Russet Burbank. These selections were: AC77101-1, AC79128-1, AC8024-5, and C08011-5.

Chipping Studies. A total of nine selections and two cultivars were tested at harvest and after various storage regimes for chipping potential. Specific gravity was determined at harvest. This data is presented in Table 2.

None of the clones chipped satisfactorily directly out of 40° F storage or with reconditioning at 60° F for three weeks after 40° F storage. Clones producing acceptable chips under most other storage regimes were: AC80545-1, BR7093-24, C07918-15, C081103-1, TXA17-1, W842, and Norchip.

Borden, Inc. evaluated 18 clones from our program for chipping potential (Table 3). Several of these clones produced acceptable chips compared to Atlantic and Norchip. Clones with excellent chip color were: AC80545-1, AC81592-2, BR7093-24, C081103-1, TXA17-1, and W842.

Two clones, WNC521-12 and WNC672-2, were tested in the National Chipping Trials sponsored by the Potato Chip/Snack Food Association. Clone AC80545-1 will be entered in this trial and WNC672-2 will be evaluated again in 1987.

Grower Tests. Four potato clones were evaluated by growers in 1986. Two clones, TC582-1 and WNC567-1, were evaluated for the second year. The other clones, AC77513-1 and AC77652-1, were grower tested for the first time. All of these clones will be retested in 1987. Data collected from a series of trials at the San Luis Valley Research Center comparing these clones with Centennial Russet and Russet Burbank is summarized in Table 4. Data is also included for AC79100-1 which will be released for initial grower testing in 1987.

Sangre Selection Studies. Seventeen line selections of Sangre were made from a tuber-unit seed lot at the San Luis Valley Research Center in 1982. Seven selections were made for typical vine and 10 for larger vines. Progeny rows of each selection were grown for increase and observational purposes in 1983. During the three year interval from 1984-1986, comparative performance trials were conducted.

Data was collected on yield, grade, stand, plant height, and vine maturity. This data is summarized in Table 5. Additionally, in 1986, data was collected on virus X and S content of the selections and the standard.

Total yield of the clones ranged from 334 to 437 cwt/a. Clones 10, 11 and 14 yielded an average of 54 cwt/a more than the standard clone, clone 18. Yield of US No. 1 potatoes ranged from 281 to 386 cwt/a. Clones 10, 11 and 14 yielded an average of 55 cwt/a more of US No. 1 tubers than the standard. Most of the yield advantage of these clones is associated with >10 oz yield. These clones yielded 38 cwt/a more of >10 oz tubers than the standard. There were no differences among clones 10, 11 and 14 compared to the standard for <4 oz or US No. 2 and cull yields.

Plant height ranged from 47 to 81 cm. Clones 10, 11 and 14 were an average of 14 cm taller than the standard. Also, these three clones were classified as medium maturing compared to early for the standard clone.

All 18 clones were checked for PVX and PVS content. None of the clones tested positive for PVX. PVS infection varied from 0 to 100 percent. PVS infection was not correlated with yield.

Tuber shape of the selections was compared to the standard. A total of 100 eight ounce tubers were measured for length, width and thickness. No significant differences were found between clones 10, 11, 14 or the standard.

Seed stocks of these selections will be released to growers for planting in 1987.

Potential Cultivar Release. Pending results of trials in 1987, TC582-1 will be named in 1988. This clone resulted from a cross of Krantz and AND71609-1 made in Texas. It was selected in 1979 from a population of seedlings grown in Colorado.

Colorado Table 1. Yield, grade, specific gravity, stand, vine maturity, tuber shape and skin type for advanced yield trial clones.

Clone	Yield (Cwt/A)						Stand	Vine Maturity ¹	Specific Gravity	Tuber Shape ² & Skin Type
	Total	Total	US #1		US #2					
			%	>10 oz	<4 oz	& Culls				
AC77101-1	388	325	84.0	90	45	17	100	1.8	1.088	Ob, R
AC77226-10	240	204	85.2	43	35	0	100	3.5	1.082	L, R
AC77226-13	278	240	86.6	48	28	10	88	3.2	1.083	L, R
AC77513-1	289	227	78.6	48	45	17	95	3.2	1.087	L, R
AC77652-1	226	170	74.6	28	52	5	94	2.0	1.077	Ob, R
AC77669-1	325	294	90.5	83	27	3	100	2.0	1.073	Ob, R
AC79128-1	394	306	77.7	82	67	21	100	2.8	1.083	Ob, R
AC8024-5	418	342	81.9	119	53	23	99	3.0	1.089	Ob, R
AC80363-1	313	196	62.2	35	109	8	100	3.2	1.093	L, R
AC80369-1	322	232	72.2	59	51	38	100	3.8	1.097	Ob, R
BC0038-1	312	187	59.9	29	72	53	100	2.8	1.095	L, W
CO7916-3	286	236	82.4	100	31	19	93	5.0	1.095	Ob, R
CO7922-1	274	208	75.5	59	61	4	96	3.8	1.087	Ob, R
CO8011-5	343	264	76.9	71	60	19	99	2.0	1.074	Ob, R
CO8014-2	319	286	89.7	98	29	4	99	3.8	1.101	Ob, R
CO8048-1	292	246	84.2	86	38	8	93	3.8	1.085	Ob, R
NDTX9-1069-4RU	285	200	70.1	30	80	5	98	1.0	1.083	Ob, R
WNC567-1	241	157	65.0	30	81	3	95	3.0	1.085	L, R
Centennial Russet	234	171	72.9	24	62	1	95	3.0	1.083	Ob, R
Krantz	171	148	86.0	53	22	2	80	1.0	1.085	Ob, R
Russet Burbank	336	186	55.2	30	84	66	99	2.8	1.089	L, R
White Rose	440	312	70.8	133	73	55	93	2.8	1.080	L, W
Mean	306	234	76.5	63	55	17	96	2.9	1.086	
LSD (0.05)	37	37	5.8	28	16	13	6	0.6	-----	

¹/ Vine maturity is rated on the following basis: 1=Very Early; 2=Early; 3=Medium; 4=Late; & 5=Very Late.

²/ Tuber Shape: R=Round; Ov=Oval; Ob=Oblong; L=Long

Skin Type: R=Russet; W=White.

Colorado Table 2. Chip color¹ and specific gravity of San Luis Valley chipping study entries.

Clone	At Harvest		3 wks 70°F		10 wks 40°F		10 wks 50°F		Reconditioned 3 wks/60°F 10 wks/40°F		10 wks/50°F		Specific Gravity
A70369-2	3.0		2.5		5.0		3.0		4.0		2.5		1.078
AC80369-1	2.0		2.0		5.0		3.0		4.0		3.0		1.077
AC80545-1	2.0		1.5		5.0		3.0		4.5		2.5		1.081
BR7093-24	2.0		1.0		5.0		3.0		4.0		2.0		1.080
CO7918-15	2.5		1.0		4.5		2.5		4.0		2.0		1.073
CO81103-1	2.0		2.0		5.0		2.5		3.5		2.0		1.084
LA-0138	2.0		2.5		5.0		3.5		4.5		3.0		1.078
TXA17-1	2.0		2.0		5.0		2.5		4.5		2.5		1.076
W842	1.0		2.0		5.0		2.0		3.5		1.5		1.089
Atlantic	2.5		2.0		5.0		3.0		4.0		3.0		1.095
Norchip	1.5		1.5		5.0		2.5		4.0		1.5		1.082

¹/ Chip color was rated using the Potato Chip/Snack Food Association 1-5 scale. Ratings of 2.5 or less are acceptable.

Colorado Table 3. Chip color evaluations by Borden, Inc.¹

Clone	Specific Gravity	Color ²	
		Sept. 3 ³	Jan. 20 ⁴
BR7093-24	1.085	1.5	1.5
W842	1.090	1.5	1.5
AC81592-2	1.079	2.5	1.5
Norchip	1.081	2.0	2.0
AC80545-1	1.077	1.5	2.5
TXA17-1	1.071	2.0	2.5
CO81103-1	1.088	2.0	2.5
Atlantic	1.095	2.5	3.0
CO8286-1	1.089	2.5	3.0
CO7918-15	1.074	1.5	3.5
AC80369-1	1.084	3.5	3.0
MN12465	1.077	2.0	3.5
LA01-38	1.082	2.5	3.5
CO80180-2	1.090	2.5	5.0
A70369-2	1.082	3.0	5.0
CO80180-4	1.081	3.5	5.0
MN12567	1.078	4.0	5.0
CO8101-1	1.073	5.0	8.0

1/ Data collected by Mr. Larry Anderson.

2/ Color was rated using the PCII 1-10 scale. Ratings of 1-4 acceptable, 5 marginal.

3/ Potatoes were harvested August 29 - September 1.

4/ Stored at approximately 50°F until January 10, then warmed to 60°F 10 days prior to frying.

Colorado Table 4. Comparison of advanced numbered selections with Centennial Russet and Russet Burbank for yield, grade, maturity and grade defects.

Clone	Yield (Cwt/A)		% US #1	Vine Maturity ¹	% External Defects ²	% Hollow Heart ³
	Total	US #1				
AC79100-1	371	299	80.8	4.0	5.6	0.5
AC77513-1	333	256	76.6	3.6	6.6	2.4
AC77652-1	256	200	77.8	2.2	3.8	1.4
TC582-1	351	268	77.1	4.0	2.6	0.5
WNC567-1	305	231	75.0	2.5	3.6	0.1
Centennial Russet	280	213	74.9	3.1	1.6	0.8
Russet Burbank	352	227	63.7	2.8	10.0	0.9

1/ Vine maturity: 1=Very Early; 2=Early; 3=Medium; 4=Late; 5=Very Late.

2/ Includes defects such as growth crack, second growth, misshapen, and alligator hide.

3/ Based on tubers greater than 10 ounces.

Colorado Table 5. Yield, grade, stand, PVS content, plant height, and vine maturity of 18 Sangre clones, 1984-1986 summary.

Clone	Total	Yield (Cwt/A)				<4 oz	US #2		% Stand	% Virus S ¹	Plant	
		Total	US #1	%	>10 oz		US #2	& Culls			Height (cm)	Vine Maturity ²
1	342	290	84.8	53	50	2	2	2	95	15	49	2.1
2	344	285	83.1	55	54	2	2	2	97	30	49	1.8
3	335	281	84.5	51	49	2	2	2	94	50	47	2.1
4	358	301	83.9	48	55	2	2	2	98	0	51	1.9
5	363	306	84.4	73	53	1	1	1	98	5	50	1.8
6	376	314	83.4	118	35	13	13	13	100	40	81	4.9
7	370	312	83.9	92	46	5	5	5	99	5	74	4.2
8	404	351	87.1	93	45	3	3	3	99	30	64	3.3
9	356	294	82.5	95	48	6	6	6	96	45	78	4.4
10	437	386	88.3	125	45	2	2	2	99	10	64	3.5
11	425	369	86.9	109	50	5	5	5	98	5	65	3.4
12	386	342	88.9	96	37	2	2	2	97	100	64	3.1
13	362	307	84.7	100	46	4	4	4	98	50	75	4.5
14	414	370	89.4	127	34	6	6	6	97	25	63	3.2
15	387	329	85.1	87	53	2	2	2	98	100	61	3.2
16	381	322	84.6	62	56	1	1	1	99	5	49	1.8
17	388	316	81.7	51	66	3	3	3	99	5	51	2.1
18 ³	371	320	85.9	82	46	2	2	2	98	20	50	2.2
Mean	378	322	85.2	84	48	3	3	3	98	30	60	3.0
LSD (0.05)	47	46	4.1	39	17	5	5	5	NS ⁴	24	5	0.5

1/Percent virus S content based on 1986 data only.

2/Vine maturity is rated on the following basis: 1=Very Early; 2=Early; 3=Medium; 4=Late; 5=Very Late.

3/Clone 18 is the standard Sangre grown at the San Luis Valley Research Center.

4/Not significant.

FLORIDA

J. R. Shumaker, D. P. Weingartner, J. Watts, and R. E. Webb

Variety and Seedling Trials

Methods. Potato varieties and seedlings were tested for their adaptability and desirable horticultural characteristics at the Agricultural Research Center, Hastings, Florida. Clones were grown in screening trials (replicated either 1 or 2 times. Telone[®] (6 gpa preplant) and Temik[®] (3 lb ai/A in-the-row at planting) were applied to all trials. Seed was spaced 12 inches apart in 20 foot single row plots. Between row spacing was 40 inches. The crop was planted February 13 and harvested May 27-29. Commercial cultural practices were used in all tests. Yield of Tubers, their appearance and specific gravity were taken at harvest. Tuber samples were shipped to Berwick, Pennsylvania, for chip color evaluations. The tests were grown under dry, favorable conditions.

Round White Adaptability and Processing Quality Trials. In 1986, 270 USDA seedling clones were grown and compared to the standard chip processing cultivar, Atlantic. A number of clones combined highly desirable tuber yields and solids and other desirable processing traits which were equal to or better than Atlantic (B0178-14, B0178-34, B0179-41, B0195-5, B0201-34, B0202-4, B0234-8, B0237-1, B0238-4, B0246-4 and B0256-15). A number of clones also produced good to excellent yields, and while they are not acceptable for chip processing, they do demonstrate excellent fresh market traits (B0172-15, B0178-3, B0178-35, B0180-36, B0185-4, B0191-16, B0233-1 and B0238-30). These clones and those demonstrating desirable processing traits will be evaluated in replicated trials during 1987.

Long Russet Adaptability Trials. A number of russet-skin potato seedlings have produced tuber yields and other fresh market traits equal to or better than Centennial, standard russet-skin cultivar. Of 92 USDA seedling clones tested in observational trials, 20 will be further evaluated in replicated trials during 1987.

Florida Table 1. Results from several clones selected for screening process at Hastings, FL -- 1986.

Clone	Tuber Appear- ance ^{1/}	Yield (cwt/A)			Specific Gravity	Chip Color ^{4/}			Average
		Size B ^{2/}	PO ^{3/}	US 1A		6/1	6/10	6/17	
<u>White Skin</u>									
B9140-32	6.5	20	7	160	1.077	3	2 +	2	2.3
B9340-13	6.5	9	25	55	1.074	-	-	-	-
B9384-4	7.5	25	29	198	1.072	2	4	1	2.3
B9792-1B	7.5	13	16	104	1.073	2	1	3 +	2.0
B9792-8B	5.5	9	36	86	1.073	3	4	3 +	3.3
B9792-16B	6	13	23	122	1.074	3	3	3	3.0
B9792-53	5	11	35	93	1.084	2	2	2	2.0
B9792-54	5.5	10	33	150	1.074	4	3 +	5 +	4.0
B9792-61	5.5	8	44	90	1.069	-	-	-	-
B9792-69	6	12	24	101	1.074	3	2 +	2 +	2.3
B9792-79	6	17	22	155	1.075	2 +	3	3	2.7
B9792-132	5	24	36	74	1.071	-	-	-	-
B9792-136	6	13	64	71	1.072	-	-	-	-
B9792-149	4.5	20	40	72	1.072	-	-	-	-
B9792-157	5.5	16	36	144	1.068	-	-	-	-
B9955-10	7.5	30	32	148	1.084	3	3	3	3.0
B9955-11	7	19	37	151	1.081	-	-	-	-
B9955-28	8	8	31	57	1.065	-	-	-	-
B9955-33	7.5	10	47	102	1.080	-	-	-	-
B9988-10	6.5	9	23	49	1.066	-	-	-	-
B9988-14	7.5	13	35	80	-	-	-	-	-
B9988-24	8.5	7	22	123	1.074	3	3 +	3	3.0
B9988-23	7.5	14	29	88	1.074	-	-	-	-
B0035-41	7	5	26	109	1.077	-	-	-	-
B0172-38	5.5	4	23	76	1.070	-	-	-	-
B0179-4	5	22	38	64	1.092	-	-	-	-
B0179-9	7	14	33	150	1.089	6	3	4	4.3
B0237-6	6.5	22	25	141	1.074	-	-	-	-
B0238-13	7	13	51	89	1.076	2	3 +	5	3.3
B0240-11	6	14	27	217	1.073	-	-	-	-
B0242-2	8	17	18	285	1.069	2 -	2	2 +	2.0
B0243-18	4	23	36	208	1.072	3 +	2	2	2.3
B0257-8	8	10	34	184	1.084	3	4	2	3.0
Atlantic	6.3	14	36	167	1.077	-	-	-	-
Sebago	7.8	23	25	273	1.067	2	4	3 +	3.0
B0048-4	7.5	21	39	121	1.065	-	-	-	-
B0048-5	8	24	44	170	1.074	-	-	-	-
B0048-7	6.5	29	45	161	1.066	-	-	-	-
B0048-9	7	11	38	244	1.069	7	-	-	-
B0172-3	7	12	29	170	1.071	4	6	-	-
B0172-5	6	8	49	117	1.071	-	-	-	-
B0172-9	5.5	22	27	163	1.077	-	-	-	-
B0172-11	5.5	16	40	166	1.071	-	-	-	-
B0172-12	6	13	59	188	1.071	-	-	-	-
B0172-15	8	16	1	315	1.070	5	-	-	-

Florida Table 1. Continued

Clone	Tuber Appearance ^{1/}	Yield (cwt/A)			Specific Gravity	Chip Color ^{4/}			Average
		Size B2/	PO3/	US 1A		6/1	6/10	6/17	
B0172-16	5	20	38	105	1.071	-	-	-	-
B0172-21	7	12	42	181	1.074	-	-	-	-
B0172-22	6.5	25	24	139	1.077	3	2	5	3.3
B0172-38	7	8	25	140	1.074	6 +	7	-	-
B0174-1	6.5	14	23	151	1.074	-	-	-	-
B0174-7	3	23	32	67	1.065	-	-	-	-
B0174-9	6	12	29	173	1.075	-	-	-	-
B0174-10	6	31	22	200	1.087	6	6	-	-
B0174-11	6.5	7	36	134	1.083	-	-	-	-
B0174-13	5.5	15	18	225	1.080	-	-	-	-
B0174-15	6.5	23	38	101	1.069	-	-	-	-
B0174-16	7	16	41	209	1.081	4	6	-	-
B0174-19	5.5	20	35	128	1.076	-	-	-	-
B0174-23	6	11	35	52	1.085	-	-	-	-
B0174-28	7.5	9	26	170	1.071	4 -	5	-	-
B0174-29	6.5	24	52	80	1.069	-	-	-	-
B0174-36	6	13	28	84	1.066	-	-	-	-
B0174-37	7.5	11	29	175	1.078	-	-	-	-
B0175-1	7.5	13	30	162	1.074	-	-	-	-
B0175-2	5	19	50	109	1.078	-	-	-	-
B0175-7	6	8	34	88	1.076	-	-	-	-
B0175-20	5.5	12	36	86	-	-	-	-	-
B0175-21	5	8	17	105	-	-	-	-	-
B0176-8	5.5	19	49	167	1.074	-	-	-	-
B0176-24	7	20	56	169	1.076	-	-	-	-
B0176-25	6	23	33	169	1.064	-	-	-	-
B0176-28	6.5	21	34	151	1.078	-	-	-	-
B0176-36	6	15	51	49	1.073	-	-	-	-
B0177-6	5.5	22	24	114	1.076	-	-	-	-
B0177-16	5.5	23	70	133	1.065	-	-	-	-
B0177-20	6.5	21	34	88	1.079	-	-	-	-
B0178-3	8	13	48	306	1.079	6	5	-	-
B0178-7	6	17	28	118	1.066	-	-	-	-
B0178-13	7.5	7	78	119	-	-	-	-	-
B0178-14	8	13	63	202	1.081	2	6 +	3	3.7
B0178-16	3.5	17	41	132	1.071	2	3	4	3.0
B0178-21	5	18	50	108	1.080	3 +	3	4	3.3
B0178-27	5.5	21	27	192	1.078	5	5	-	-
B0178-30	7	9	35	179	1.076	2	3	4	3.0
B0178-34	6.5	11	37	213	1.080	2	3	2	2.3
B0178-35	6.5	21	22	281	1.074	4	4	-	-
B0178-39	6	17	35	181	1.083	3	3 +	3 +	3.0
B0179-1	7	9	30	166	1.079	-	-	-	-
B0179-6	7.5	12	48	106	1.080	-	-	-	-
B0179-15	8	9	20	214	1.073	-	-	-	-
B0179-17	6	10	36	260	1.076	-	-	-	-

Florida Table 1. Continued

Clone	Tuber Appearance ^{1/}	Yield (cwt/A)			Specific Gravity	Chip Color ^{4/}			Average
		Size B ^{2/}	PO ^{3/}	US 1A		6/1	6/10	6/17	
B0179-18	6	14	32	206	1.075	-	-	-	-
B0179-19	6	26	20	196	1.082	-	-	-	-
B0179-20	5.5	17	31	122	1.082	-	-	-	-
B0179-27	7.5	12	26	123	1.079	2	4	5	3.7
B0179-30	7	10	38	130	1.072	-	-	-	-
B0179-41	4.5	17	28	202	1.079	2	4	3	3.0
B0179-48	6	18	30	114	1.077	-	-	-	-
B0180-24	5.5	43	40	251	1.072	7	5	-	-
B0180-36	6	37	40	275	1.078	6	5	-	-
B0181-9	6	16	26	148	1.075	-	-	-	-
B0183-25	5	31	51	205	1.076	7	7	-	-
B0183-27	7	10	32	211	1.070	-	-	-	-
B0183-30	7	25	44	262	1.079	6	6	-	-
B0183-31	6	18	58	186	1.069	-	-	-	-
B0185-4	7	26	19	280	1.071	5	6	-	-
B0186-9	7	16	69	156	1.083	-	-	-	-
B0191-5	6.5	18	43	276	1.083	6	5	-	-
B0191-10	6	29	46	245	1.074	4	3	3	3.3
B0191-12	7	6	36	127	1.075	-	-	-	-
B0191-16	5.5	15	36	317	1.074	-	-	-	-
B0191-18	5.5	17	16	220	1.083	-	-	-	-
B0192-6	7	21	30	178	1.080	-	-	-	-
B0192-9	6	22	39	179	1.075	-	-	-	-
B0195-5	5.5	16	59	254	1.083	2	2	4	2.7
B0197-24	7	16	39	262	1.068	7	-	-	-
B0197-29	7	11	25	249	1.073	-	-	-	-
B0197-30	7	21	38	260	1.071	-	-	-	-
B0198-3	6	12	16	223	1.076	-	-	-	-
B0199-8	6.5	13	46	120	1.065	-	-	-	-
B0199-4	5.5	43	50	158	1.075	-	-	-	-
B0199-13	6.5	24	35	178	1.066	-	-	-	-
B0200-25	6.5	12	48	155	1.070	2 +	5	4	3.7
B0200-27	5	24	40	122	1.071	-	-	-	-
B0200-29	7.5	13	26	162	1.071	-	-	-	-
B0200-34	6	17	57	185	1.064	-	-	-	-
B0200-36	7	43	39	183	1.080	-	-	-	-
B0201-1	6.5	18	90	185	1.067	4	6	-	-
B0201-14	7	32	38	256	1.068	3	4	5	4.0
B0201-34	8	8	36	231	1.074	3	4	7	4.7
B0202-2	7	19	55	187	1.074	-	-	-	-
B0202-4	7	30	40	253	1.072	2	2	4	2.7
B0202-7	5.5	21	46	184	1.069	-	-	-	-
B0202-12	4.5	21	20	78	1.072	-	-	-	-
B0202-16	6.5	27	27	136	1.071	-	-	-	-
B0202-20	4.5	30	40	83	1.077	-	-	-	-
B0202-21	5.5	25	42	138	1.078	4	3	6	4.3
B0203-12	4.5	29	39	162	1.077	-	-	-	-

Florida Table 1. Continued

Clone	Tuber Appearance ^{1/}	Yield (cwt/A)			Specific Gravity	Chip Color ^{4/}			Average
		Size B ^{2/}	PO ^{3/}	US 1A		6/1	6/10	6/17	
B0203-17	6.5	26	30	126	1.077	-	-	-	-
B0203-18	7	29	22	158	1.080	5 +	5	-	-
B0203-20	6.5	46	26	157	1.075	-	-	-	-
B0203-21	7.5	9	22	263	1.073	5	6	-	-
B0203-22	5.5	15	43	107	1.069	-	-	-	-
B0203-24	7.5	11	25	228	1.068	-	-	-	-
B0204-14	3.5	24	56	214	1.068	-	-	-	-
B0204-16	4.5	27	55	82	1.069	-	-	-	-
B0204-26	5.5	36	68	148	1.067	-	-	-	-
B0204-27	5.5	33	30	105	1.066	-	-	-	-
B0205-4	6	11	51	168	1.073	-	-	-	-
B0205-8	7.5	14	33	187	1.075	-	-	-	-
B0205-11	6	13	35	201	1.072	-	-	-	-
B0205-18	5	26	25	119	1.077	-	-	-	-
B0205-21	6.5	14	64	283	1.076	5	6	-	-
B0206-7	5.5	4	25	42	1.072	-	-	-	-
B0206-15	5	25	34	133	1.077	-	-	-	-
B0207-9	6	28	34	97	1.076	-	-	-	-
B0209-1	4.5	16	75	168	-	-	-	-	-
B0213-2	7	10	47	203	1.069	-	-	-	-
B0213-7	6.5	33	26	271	1.066	-	-	-	-
B0213-16	3	35	30	170	1.065	-	-	-	-
B0214-5	3.5	23	29	270	1.066	3	2	4	3.0
B0214-9	6	14	29	276	1.064	3	3	3	3.0
B0214-17	7	19	37	223	1.067	-	-	-	-
B0215-7	6	31	53	133	1.070	-	-	-	-
B0215-10	8	40	15	226	1.071	-	-	-	-
B0216-3	5.5	24	16	191	1.075	-	-	-	-
B0216-11	8	20	20	198	1.077	-	-	-	-
B0218-7	6.5	18	38	114	1.069	-	-	-	-
B0218-11	7.5	33	44	145	1.075	-	-	-	-
B0219-5	7	23	57	77	1.071	-	-	-	-
B0219-6	6.5	21	23	142	1.070	-	-	-	-
B0220-3	8	32	40	205	1.071	-	-	-	-
B0233-1	7	21	13	334	1.073	-	-	-	-
B0233-14	6	8	38	224	1.073	-	-	-	-
B0234-4	7	16	17	199	1.076	2	2 +	4 -	2.7
B0234-5	7.5	17	23	225	1.067	-	-	-	-
B0234-7	6	21	41	198	1.077	-	-	-	-
B0234-8	6	14	28	225	1.077	3	3	3	3.0
B0234-23	6	23	27	196	1.069	-	-	-	-
B0235-1	6.5	22	38	197	1.067	-	-	-	-
B0235-5	5.5	28	19	175	1.069	-	-	-	-
B0236-10	5.5	23	23	139	1.068	-	-	-	-
B0237-1	6	33	21	245	1.075	3	3	4 -	3.3
B0237-6	5.5	16	11	114	1.077	-	-	-	-
B0237-8	5.5	33	42	130	1.073	-	-	-	-
B0237-9	7	11	30	268	1.077	3	2	3 +	2.7

Florida Table 1. Continued

Clone	Tuber Appear- ance ^{1/}	Yield (cwt/A)			Specific Gravity	Chip Color ^{4/}			Average
		Size B ^{2/}	PO ^{3/}	US 1A		6/1	6/10	6/17	
B0237-14	6.5	21	25	270	-	-	-	-	-
B0237-15	6.5	15	57	200	1.077	-	-	-	-
B0237-17	7.5	12	18	251	1.077	4	4	-	-
B0237-26	7	23	28	233	1.075	-	-	-	-
B0237-33	6.5	11	43	118	1.071	-	-	-	-
B0238-4	6.5	11	33	251	1.077	4	2	5	3.7
B0238-11	6.5	41	23	187	1.076	-	-	-	-
B0238-13	7	28	33	197	1.078	-	-	-	-
B0238-16	7	16	30	173	1.078	-	-	-	-
B0238-18	6.5	21	32	225	1.077	-	-	-	-
B0238-21	6	12	32	254	1.071	2	2	3	2.3
B0238-24	6.5	16	26	215	1.077	3 +	5 +	-	-
B0238-29	6.5	10	27	175	1.068	-	-	-	-
B0238-30	7.5	17	36	304	1.075	-	-	-	-
B0238-31	6.5	15	13	258	1.076	-	-	-	-
B0238-36	7	12	37	130	1.066	-	-	-	-
B0238-35	7.5	22	14	152	1.077	-	-	-	-
B0239-2	8	11	27	198	1.067	-	-	-	-
B0239-6	7.5	13	31	151	1.071	-	-	-	-
B0239-16	7.5	14	15	236	1.073	-	-	-	-
B0239-18	7	12	4	150	1.072	-	-	-	-
B0239-19	8.5	17	25	258	1.066	3	5	3	3.7
B0239-23	7.5	14	42	230	1.070	-	-	-	-
B0239-24	6.5	3	28	75	1.072	-	-	-	-
B0239-29	6.5	26	16	214	1.074	-	-	-	-
B0240-16	7.5	8	15	222	1.070	2	4	5 +	3.7
B0240-11	7.5	18	16	222	1.071	2	2	1	1.7
B0241-7	6.5	24	20	126	1.073	-	-	-	-
B0241-8	8	17	21	275	1.073	2	4	3	3.0
B0241-10	6	15	35	187	1.066	-	-	-	-
B0242-2	6.5	16	20	204	1.067	-	-	-	-
B0242-3	7	23	17	251	1.075	-	-	-	-
B0242-27	6	16	32	171	1.073	-	-	-	-
B0242-31	6.5	18	18	250	1.066	4	2	3	3.0
B0242-34	5.5	16	14	143	1.065	-	-	-	-
B0243-7	5.5	9	10	266	1.069	2	2	3 +	2.3
B0243-11	7	9	41	270	1.073	3 -	5	-	-
B0243-18	6.5	8	31	213	1.071	-	-	-	-
B0243-20	6.5	6	23	161	1.072	2 +	4	3	3.0
B0244-3	6	26	33	208	1.072	-	-	-	-
B0244-4	5.5	17	46	188	1.073	-	-	-	-
B0244-6	5.5	37	43	279	1.075	4	3	3	3.3
B0245-8	7	8	26	232	1.069	3	3	3	3.0
B0245-11	5.5	17	41	187	1.071	-	-	-	-
B0246-4	7.5	11	34	260	1.077	2 +	2	3	2.3
B0246-6	7	8	36	232	1.076	2	2 +	2	2.0
B0246-7	7	20	26	183	1.073	2 -	3	5 +	3.3
B0246-8	7	8	16	103	1.075	-	-	-	-

Florida Table 1. Continued

Clone	Tuber Appear- ance ^{1/}	Yield (cwt/A)			Specific Gravity	Chip Color ^{4/}			Average
		Size B2 ^{2/}	PO3 ^{3/}	US 1A		6/1	6/10	6/17	
B0246-12	6	6	61	108	1.078	-	-	-	-
B0249-4	4.5	20	35	142	1.077	-	-	-	-
B0249-7	7.5	13	27	133	1.067	-	-	-	-
B0249-8	7.5	17	37	225	1.071	3	4	3	3.3
B0249-11	5.5	15	34	132	1.074	-	-	-	-
B0245-1	6	24	38	170	1.077	-	-	-	-
B0245-21	7.5	11	19	116	1.064	-	-	-	-
B0245-22	6.5	20	33	195	1.069	-	-	-	-
B0255-2	7.5	17	23	242	1.074	3	2	4	3.0
B0255-5	8	20	20	238	1.073	-	-	-	-
B0255-9	7.5	15	23	221	1.081	2	2	2 +	2.0
B0255-10	6	20	17	195	1.074	-	-	-	-
B0256-1	6.5	11	22	226	1.080	-	-	-	-
B0256-7	7.5	15	38	258	1.066	5	5	-	-
B0256-15	7.5	23	23	234	1.079	3 +	2	3	2.7
B0257-3	7	21	22	214	1.073	-	-	-	-
B0257-5	6.5	24	16	232	1.085	-	-	-	-
B0257-8	7.5	28	24	188	1.079	2	2 +	2	2.0
B0257-9	8.5	11	24	169	1.074	3	1	2	2.0
B0257-10	7	19	34	153	1.080	2	4	5	3.7
B0257-12	7.5	15	21	151	1.073	2	2	2	2.0
B0257-17	8	19	41	210	1.073	-	-	-	-
B0199-12	7.5	20	37	138	1.063	-	-	-	-
B0172-23	5	12	12	265	1.076	-	-	-	-
B0172-33	8	16	3	192	1.070	-	-	-	-
B0172-35	6	14	7	190	1.071	-	-	-	-
B0176-15	6	14	31	139	1.077	-	-	-	-
B0176-21	6	12	22	210	1.083	-	-	-	-
B0177-11	7	7	8	144	1.084	2	2 +	2	2.0
B0178-41	6	24	3	179	1.090	-	-	-	-
B0179-4	6	29	11	168	1.078	-	-	-	-
B0179-9	8	16	0	200	1.087	-	-	-	-
B0179-36	7	14	19	219	1.079	-	-	-	-
B0179-37	6	23	5	161	1.074	-	-	-	-
B0181-2	6	26	0	257	1.078	-	-	-	-
B0181-3	3	22	2	172	1.081	-	-	-	-
B0184-18	7	49	24	147	1.071	-	-	-	-
B0188-14	4	10	27	221	1.068	-	-	-	-
B0190-2	4	35	27	269	1.088	-	-	-	-
B0192-5	6	12	4	247	1.069	-	-	-	-
B0237-30	3	12	7	202	1.070	-	-	-	-
B0238-26	7	8	3	216	1.066	-	-	-	-
B0238-28	6	5	16	174	1.069	-	-	-	-
B0239-20	6	17	3	183	1.070	-	-	-	-
B0243-10	6	16	14	180	1.076	-	-	-	-
Atlantic	6.3	12	30	264	1.083	3	3	5	4.0
Sebago	7.2	25	31	268	1.066	4	5	4	4.2
Superior	7.4	18	47	131	1.074	6	3	5	4.7

Florida Table 1. Continued

Clone	Tuber Appear- ance ^{1/}	Yield (cwt/A)			Specific Gravity	Chip Color ^{4/}			Average
		Size B2 ^{2/}	PO ^{3/}	US 1A		6/1	6/10	6/17	
<u>Red Skin</u>									
B0032-17	8	10	17	129	1.068	-	-	-	-
B0032-40	8	28	23	186	1.068	2	3 +	3	2.7
B0033-23	7.5	12	34	132	1.073	-	-	-	-
<u>Russet Skin</u>									
B9540-55	7	25	18	178	1.061	-	-	-	-
B9540-62	7	18	27	217	1.065	-	-	-	-
B9569-2	6.5	35	54	166	1.068	-	-	-	-
B9596-2	6.5	9	33	213	1.066	-	-	-	-
B9792-158	4.5	23	43	196	1.074	-	-	-	-
B9812-2	6	31	46	139	1.076	-	-	-	-
B9907-1	8	23	8	183	1.069	-	-	-	-
B9922-11	7.5	11	22	260	1.083	-	-	-	-
B9924-22	8	13	21	256	1.072	-	-	-	-
B9926-25	6.5	34	11	187	1.073	-	-	-	-
B9959-18	2	20	173	40	1.065	-	-	-	-
B0015-43	1.5	10	171	26	-	-	-	-	-
B0036-6	7.5	5	23	264	1.075	-	-	-	-
B0039-20	6.5	32	33	181	1.072	-	-	-	-
B0039-6	6.5	28	23	251	1.074	-	-	-	-
B0039-21	6.5	33	29	163	1.076	-	-	-	-
B0041-7	8	22	21	224	1.076	-	-	-	-
B0042-2	7	35	45	114	1.070	-	-	-	-
B0042-4	5.5	9	20	56	1.069	-	-	-	-
B0042-7	7	27	13	169	1.071	-	-	-	-
B0042-10	7	13	28	161	1.065	-	-	-	-
B0042-11	4.5	30	18	53	1.075	-	-	-	-
B0042-15	5.5	39	47	105	1.077	-	-	-	-
B0044-1	7	14	56	195	1.071	-	-	-	-
B0045-6	6	24	22	285	1.096	-	-	-	-
B0045-12	7.5	73	16	172	1.079	-	-	-	-
B0047-5	6.5	62	30	189	1.075	-	-	-	-
B0046-23	6	42	28	155	1.073	-	-	-	-
Centennial	8	23	29	212	1.065	-	-	-	-
B0169-56	7.5	42	28	262	1.071	-	-	-	-
B0171-30	6.5	14	32	201	1.067	-	-	-	-
B0180-18	7.5	21	14	259	1.069	-	-	-	-
B0182-2	6	38	43	203	1.069	-	-	-	-
B0184-2	6	67	26	159	1.081	-	-	-	-
B0184-12	4	47	51	157	1.078	-	-	-	-
B0184-16	7	53	9	281	1.080	-	-	-	-
B0184-26	6	41	10	203	1.077	-	-	-	-
B0184-28	5.5	24	54	197	1.073	-	-	-	-
B0184-30	6.5	31	29	289	1.084	-	-	-	-
B0184-32	5.5	37	66	186	1.067	-	-	-	-

Florida Table 1. Continued

Clone	Tuber Appearance ^{1/}	Yield (cwt/A)			Specific Gravity	Chip Color ^{4/}			Average
		Size B2/	PO3/	US 1A		6/1	6/10	6/17	
B0186-1	8	13	25	253	1.069	-	-	-	-
B0186-3	7	40	23	225	1.082	-	-	-	-
B0186-11	5	23	68	218	1.077	-	-	-	-
B0186-12	4	34	36	136	1.077	-	-	-	-
B0186-14	5.5	20	35	160	1.082	-	-	-	-
B0186-20	6.5	25	40	140	1.081	-	-	-	-
B0186-21	7.5	50	11	166	1.075	-	-	-	-
B0186-23	7	23	39	245	1.091	-	-	-	-
B0186-25	5	28	43	185	1.078	-	-	-	-
B0187-3	4.5	37	33	138	1.080	-	-	-	-
B0188-18	5.5	56	11	149	1.072	-	-	-	-
B0189-12	7	24	58	170	1.081	-	-	-	-
B0189-21	5	39	44	189	1.067	-	-	-	-
B0189-32	6.5	30	45	213	1.074	-	-	-	-
B0189-42	6	31	27	274	1.077	-	-	-	-
B0189-45	8	41	9	226	1.071	-	-	-	-
B0190-9	8	16	22	320	1.079	-	-	-	-
B0190-13	7	35	17	190	1.074	-	-	-	-
B0216-13	6.5	34	24	196	1.072	-	-	-	-
B0220-2	6	22	33	177	1.069	-	-	-	-
B0220-4	6.5	38	27	197	1.069	-	-	-	-
B0231-3	7.5	14	10	288	1.068	-	-	-	-
B0232-2	7.5	31	39	222	1.073	-	-	-	-
B0251-5	7.5	5	34	247	1.078	-	-	-	-
B0166-1	7	84	3	212	1.073	-	-	-	-
B0166-4	6	120	9	122	1.074	-	-	-	-
B0166-8	7	33	7	228	1.064	-	-	-	-
B0166-12	5	56	22	201	1.075	-	-	-	-
B0169-6	5	62	60	139	1.067	-	-	-	-
B0169-26	5	50	68	135	1.059	-	-	-	-
B0169-45	5	40	67	224	1.070	-	-	-	-
B0180-4	1	85	12	176	1.063	-	-	-	-
B0180-8	7	23	42	256	1.069	-	-	-	-
B0180-11	5	49	49	143	1.069	-	-	-	-
B0180-17	6	22	31	212	1.056	-	-	-	-
B0180-31	6	42	28	207	1.065	-	-	-	-
B0180-39	7	31	32	271	1.062	-	-	-	-
B0184-8	5	54	86	206	1.065	-	-	-	-
B0184-15	7	54	31	227	1.074	-	-	-	-
B0186-16	5	30	58	186	1.077	-	-	-	-
B0188-19	7	27	34	244	1.065	-	-	-	-
B0220-14	8	16	14	267	1.072	-	-	-	-
B0221-6	7	60	6	222	1.084	-	-	-	-
B0221-9	7	59	36	246	1.078	-	-	-	-
B0227-7	6	52	23	179	1.083	-	-	-	-

Florida Table 1. Continued

Clone	Tuber Appearance ^{1/}	Yield (cwt/A)			Specific Gravity	Chip Color ^{4/}			Average
		Size B ^{2/}	PO ^{3/}	US 1A		6/1	6/10	6/17	
B0228-15	5	31	0	162	1.076	-	-	-	-
B0228-19	3	31	63	89	1.069	-	-	-	-
B0228-20	4	37	61	94	1.077	-	-	-	-
B0228-34	3	34	19	92	1.081	-	-	-	-
B0228-35	3	9	106	129	1.066	-	-	-	-
Centennial	6.8	24	25	211	1.062	-	-	-	-

1/ From 10.0 = most desirable to 0.0 = completely undesirable.

2/ Size B = size under 1 7/8".

3/ PO = out of grade.

4/ Chip color: 1-4 = acceptable; 5 = borderline; 6-9 = too dark for use.

Germplasm
Development

The size and scope of the breeding effort continued as in the previous two years, this includes 100,000 single hills grown in Verticillium dahliae infested fields at Aberdeen. Additional emphasis has been placed on resistance to sugar end, i.e. darkened french fries. Thirty percent of 122 3rd-year clones were free of the defect at Aberdeen. Advanced Russet A7411-2 has moderate resistance and is scheduled for large scale processing tests. Early Russet 74114-4 continues to show promise. Chipping clone BR7093-24 will also undergo large scale trials.

Field and Storage
Diseases

Fifteen cultivars and 37 advanced selections were evaluated for resistance to Verticillium wilt, early blight (foliar and tuber phase), and common scab under typical field conditions at the University of Idaho Research and Extension Center, Aberdeen. The same clones were exposed to leafroll at Kimberly, Idaho, and tubers were evaluated for net necrosis reaction after four months storage at 50 F. Bacterial soft rot reaction of selected clones was rated after artificial inoculation with Erwinia sp., two months storage and subsequent incubation to promote soft rot development. The results are presented in Table 1. The results of Fusarium dry rot evaluations will be available at a later date.

Of the varieties tested only Rosa showed moderate Verticillium wilt and early blight resistance. A number of breeding selections did show high resistance to these field diseases, including Fredrickton selection F73008. A68113-4 and A66107-51 are known to have tuber maturity characteristics similar to Russet Burbank, but it is not known to what degree the high resistance of F73008 was conditioned by physiological immaturity. The results of the soft rot test were encouraging since BelRus, Russet Burbank, and Norgold Russet are known to exhibit soft rot problems in storage and shipment in the same increasing order that they are ranked in this test. ATD63-7 and ATD63-2 have continued to show very high soft rot resistance after several years testing using different techniques. These clones are 3X progeny from a cross between S. microdontum (2X) and cv. Butte (4X). Their reaction to Erwinia soft rot has been qualitatively different from tuberosum cultivars even at high inoculum levels. For some reason very little net necrosis developed in Russet Burbank this year. However, a number of the test selections did develop enough to indicate a potential problem. BelRus continues to show the most severe tuber early blight reaction. The cultivar GoldRus, tested for the first time this year, showed a serious reaction to tuber early blight as did several breeding selections.

Germplasm
Distribution

The distribution of potato germplasm from the Aberdeen program during 1986 is summarized in Idaho Table 2.

Idaho Table 1. Disease Evaluations

	Verticillium wilt	Early Blight foliar tuber		Common scab	Leafroll net necrosis	Bacterial soft rot
Atlantic	S	S	MR	MS	R	-
BelRus	VS	VS	VS	S	R	R
Centennial Russet	VS	S	R	S	MR	-
GoldRus	S	VS	S	VS	MR	-
Krantz	S	S	R	R	MR	-
Lemhi Russet	S	S	R	VR	MR	VS
Monona	S	S	R	MS	MR	-
Nooksack	S	S	R	R	MR	-
Norchip	S	S	MS	R	MR	S
Norgold Russet	VS	S	R	R	MR	S
Rosa	MR	MR	R	S	MR	-
Russet Burbank	S	MS	MR	R	S	MS
Russet Norkota	VS	S	R	R	MR	MS
Shepody	S	MS	VR	MS	MR	-
Sangre	S	S	R	MS	MR	-
White Rose	S	S	MR	MS	MR	-
AD7267-3	S	MR	R	R	MR	S
TC582-1	MR	R	R	VR	MR	MS
AC79100-1	MR	MR	MR	R	MR	S
A76147-2	MR	MR	R	S	MS	S
A7411-2	MR	MR	R	S	MR	MR
A74114-4	S	S	MS	R	MS	MS
A76260-16	S	S	R	MS	MR	S
A7816-14	MR	MR	MR	R	MR	-
A7896-7	MS	MR	MR	R	MR	-
A7953-4	R	R	S	R	MR	-
A7961-1	MS	MR	MS	MR	MR	-
NDA848-3	MR	MR	R	R	MR	-
A70369-2	MS	MR	R	MR	R	S
BR7093-24	MR	MR	MS	S	MR	MR
A72685-2	MR	R	R	S	MR	S
A74212-1	MR	MR	MS	MS	MR	-
AC77513-1	MR	R	MR	VS	S	-
AC77652-1	S	S	S	S	MR	-
AC9128-1	MR	MR	S	R	MR	-
BC9668-1	S	S	MS	S	R	-
C07916-3	MR	VR	MR	S	MR	-
C07922-1	S	MR	MR	MS	R	-
ATD63-2	R	VR	MS	MR	MR	R
ATD63-7	MR	R	MS	R	R	VR
A66107-51	R	R	MR	VR	MR	-
A68113-4	R	R	MS	VS	MR	-
F72090	S	S	R	MR	-	-
F73008	R	VR	MR	MS	-	-
F74047	S	S	R	MS	-	-
F75040	S	S	R	R	-	-

Idaho Table 2. Distribution of clones, seedling tubers, and seeds - 1986.

LOCATION	COOPERATOR	NUMBER	LOCATION	COOPERATOR	NUMBER
<u>Clones:</u>					
Alberta	D. Lynch	1	Michigan	R. Chase	3
Arizona	P. Bessey	2	New Mexico	J. Gregory	4
British Columbia	N. Wright	1	Nevada	D. Dunipace	1
California	V. Amoah	1	New York	R. Plaisted	4
	J. Cucuzza	2	North Dakota	R. Johansen	3
	D. Douches	28		G. Secor	4
	R. Voss	27			
Colorado	D. Holm	7	Ohio	R. Rowe	4
Florida	J. Shumaker	2		V. Stuermer	2
Hawaii	B. Wiemer	6	Oregon	D. Hane	53
Idaho	C. Davis	9		S. James	4
	J. Davis	2		A. Mosley	4
	B. Dwelle	4		C. Shock	5
	P. Guerler	5	Pennsylvania	J. Zalewski	73
	G. Kleinkopf	8			
	S. Love	4	Scotland	J. Hillman	2
	K. Mohan	35	Texas	D. Smallwood	20
	D. Peterson	10			
	J. Peterson	4			
	J. Stark	36	Utah	J. Kikkert	1
Iowa	D. Bidney	3	Washington	C. Brown	64
Kansas	T. Wagner	23		S. Kwietkowski	1
				M. Martin	339
Maine	R. Webb	9		R. Thornton	13
Manitoba	B. Rex	2	Wisconsin	B. Bowden	4
				J. Fuller	92
				J. Mattek	1
Minnesota	N. Anderson	2	Wyoming	K. Bohnenblust	4
	D. Norton	3			
	D. Preston	3			

Seedling tubers or seeds:

Alberta	D. Lynch	561 crosses	North Dakota	R. Johansen	41 families
California	A. Hakim-Elahi	61 families	Oregon	A. Mosley	178 crosses
	R. Voss	41 "	Pakistan	A. Bhatti	4 "
Colorado	D. Holm	174 "	Peru	H. Mendoza	30 "
Germany	J. Lange	16 "	Poland	M. Sieczka	20 "
Idaho	S. Hafez	2 crosses	Texas	D. Smallwood	140 families
	G. Vogt	10 "	Venezuela	R. Leon	24 crosses
Kansas	T. Wagner	15 families	Washington	C. Brown	8 "

LOUISIANA

James F. Fontenot, H. M. Brewer, and P. W. Wilson

Introduction

The objectives of the Louisiana potato breeding project remain the same but the procedure is different since the seedling tubers produced in the greenhouse are not initially planted in the north (Wisconsin) as in the past. These first-year seedlings are planted in Louisiana, and thus more emphasis is put on the environmental stress objectives such as drought, heat, frost, and air pollution tolerance. The goals of high yield and wide adaptability are not being diluted. Neither are the objectives of improved culinary quality, storage ability, tuber type, insect resistance, and disease resistance neglected.

Diverse genetic stock that possess genes for desired characters are used as parental lines, and crosses are made in the greenhouse and field. True seed derived from these crosses are planted in the greenhouse in early November. These seedlings are allowed to grow to a height of one to two inches and then transplanted to three-inch pots and allowed to grow to maturity, which is early March. Probably only 50 percent will show sufficient promise to warrant further testing. Discards are made due to poor yield, shape, color, and absence of other desirable characters. The selected clones are placed in storage at 40° F and 85 percent relative humidity until early August then planted in a field test plot at Baton Rouge, Louisiana. Natural stress conditions such as high temperature, drought, and high ozone levels exist at this time of year as well as a high insect population. Conditions of this type make it ideal to screen for virus diseases, too. These clones are harvested in early December in order to take advantage of the average first killing frost, which occurs on November 20.

Replicated trials are conducted to help evaluate all advanced clones. Some of the characters used to screen these clones are plant vigor, maturity, and yield. After yield is taken, specific gravity, chipping, boiling, and after-cooking darkening information is utilized to eliminate the undesirable lines.

Louisiana Trials

The regional trial (tables 1 and 2) was planted on 3/6/86 at our Ben Hur Farm in Baton Rouge, Louisiana. This is a later date than we like to plant, but it was impossible to prepare the land until that date. We were very fortunate that the temperature was cool during the growing season and only one irrigation was necessary. On April 15 approximately 1-1/2 inches of water was applied to all plots. Notes were taken during the growing season, and all entries in the regional trial had an excellent stand. Lines rated as being very vigorous were Red Pontiac, Wisc. 832, Wisc.

948R and Russet Burbank. All other entries showed good to medium vine vigor. Red Norland was the only clone classified as being very early in maturity. Norgold Russet and NEA 71.72-1 were rated early in maturity, whereas NDT 9-1068-11R and Russet Burbank were very late in maturity. At harvest, data was taken on external defects and a number of clones showed some scab, but the lesions were small and superficial. The entries with the most scab were MN12161, MS704-10, W832, MS700-83, BN9803-1, and Norchip. The greatest number of growth cracks were observed in NDT9-1068-11R. Tubers of Russet Burbank had the most second growth. Sun green was not a great problem. Some greening was observed in BN9803-1, ND860-2, and W879. We took data on internal defects and found no problem with hollow heart and internal necrosis. NE165.75.2 tubers showed 10 percent vascular discoloration.

The top clones in yield of U.S. number one tubers were NDT9-1068-11R, Red Pontiac, and MN12567, whereas W879, NDT9-1068-11R and Norland produced the highest percent of number one grade tubers. The total solids were determined with a potato hydrometer, and it was found that W832, MS704-10, and BN9803-1 were highest in this quality factor. Three clones were better than Norchip in chipping ability, and these were ND860-2, MS804-10, and W879. In a storage test, W879 was classified as having excellent storage ability, and ND651-9, NEA71.72-1, BN8903-1, and NDT9-1068-11R were good in storage quality. Norgold Russet was better in yield and shape in Louisiana than ever before, and ND671-4 Russ really did russet well in the south. After considering all factors, that make up a good clone, NDT9-1068-11R was rated first in overall worth as a variety, W879 second, MN12567 third, ND860-2 fourth, and ND651-9 fifth. I think it should be mentioned that tubers of ND651-9 were cut and planted in a fall planting experiment in 1985 and produced an excellent plant stand.

Red LaSoda and Kennebec were planted as checks in the regional trial. Red LaSoda was classified as very vigorous and late in maturity. This cultivar produced 165 cwt/A U.S. number one tubers and 52 cwt/A number two tubers. Kennebec was rated very vigorous and very late in maturity while producing 74 cwt/A number ones and 27 cwt/A number two tubers.

A source of seed experiment (Table 3) was initiated since we no longer had a source of seed in Wisconsin. Mother tubers of 43-18, Red Norland, 12-59, LaChipper, 01-38, and Red LaSoda were obtained from a planting made on 3/12/85 and harvested on 6/20/85 at the LSU Ben Hur Farm. These tubers were stored for approximately 8-1/2 months at 40° F and 85 percent relative humidity before planting on 3/6/86. Tubers from all these cultivars kept very well under these storage conditions. Comparisons were made with certified Red LaSoda grown on Haas Farms Inc., Hemingford,

Nebraska in 1985. It is not possible to get the history of this seed, but I assume they were planted in mid-May and harvested in mid-September. Certified seed of Red LaSoda from Nebraska produced more U.S. number one tubers than any other entry in this test and produced only 3.1 cwt/A more than Louisiana grown seed of Red LaSoda. When comparing Nebraska-certified seed of Red LaSoda and Louisiana seed of this cultivar, one should note that the certified seed produced 30 cwt/A more than the uncertified, but there is storage cost of 8-1/2 months at 40° F. The two white skin cultivars in this trial were LaChipper and 01-38. Both did well considering this was Louisiana-grown seed; 01-38 produced 40 cwt/A of number ones more than LaChipper and had the same chip quality rating.

The vigor, maturity, and percent external defects are presented in Table 4. Data on internal defects were taken and tubers of 43-18 showed 32 percent vascular discoloration, LaChipper 8 percent, and Red Norland 4 percent, while no other entries showed vascular discoloration.

The results of a potato spacing test are presented in Table 5. Seed-pieces of certified Red LaSoda were spaced 12", 16", 20", and 24" apart in a randomized block design experiment replicated four times. Plants spaced 12" apart in a five-foot row produced 214 cwt/A of U.S. number one tubers. Plants spaced 16", 20", and 24" apart produced 191, 180, and 154 cwt/A of U.S. number one tubers, respectively. The same trend was found in total yield. No growth cracks were observed on tubers produced from plants spaced one foot apart, yet tuber second growth occurred at 12" and 24" spacing. No difference was found in specific gravity and potato chip quality. No tubers produced from plants at these spacings had hollow heart.

Twenty-five lines remain of the original selections made in the field at Rhinelander, Wisconsin in 1980, 1982, 1983, and 1984 (Table 6). The ones that performed the best in 1986 were 21-46, 31-100, 31-131, 41-2, 41-5, 41-25, 41-50, 41-53, 41-67, and 41-69.

Our 1985 lines were derived from true seed planted on 11/6/84 and harvested in the greenhouse on 3/6/85. One tuber from each selection was kept in family containers and stored at 40° F and 85 percent RH until planted in the field at L.S.U. Hill Farm on 8/7/85. These single hill individuals were harvested on 11/21/85, and 112 selections were made and numbered 52-1 thru 52-112 (the number could be 51, 52, or 53, depending on the skin color) and were stored in the greenhouse until planted at Ben Hur on 3/6/86. The tubers produced in the field were small, and this may have been due to the very wet and warm fall (Juan was the hurricane). Experiences in Wisconsin suggested that the plants' tubers would have been large. Only one tuber of each selection was planted at Ben Hur, and the

others were held in reserve in the 40° F room. The season at Ben Hur was good for potato production, the plants and tubers were large, and 19 lines were considered worthy of further study at harvest on 6/4/86. Clone 51-60 was very outstanding and it would have been nice to send this clone to the North (Wisconsin or Nebraska) for further increase.

Clones from some families were not planted on 8/7/85 because not enough land was prepared at that time; therefore, they were kept in the greenhouse until planted on the hill 9/24/85, and all tubers had long sprouts. Plants and tubers were small, and when the temperature on 12/15/85 fell to 24° F everything was killed. Tubers were harvested on 12/20/85 and stored in the lab (Room 165) until planted 3/6/86 at Ben Hur. Selections were numbered 51-113 through 51-183, and nine were considered worthy of further study on 6/4/86.

Of the 183 clones that were selected in the field in 1985, a total of 28 were classified as very promising at harvest. Since we had tubers from each of these left over from the March planting, one pot of each clone was planted in a very hot (95-100° F) greenhouse on 7/17/86. Only five clones had emerged on August 22, and these were 51-35 (a short rest type), 51-63 (a short rest type), 52-107 (a long rest type), 51-125 (a long rest type), and 52-162 (a long rest type). The most outstanding under this high temperature stress condition was 51-63, 51-35 second, 52-107 third, 51-125 fourth, and 52-162 fifth.

True seed of 27 families were planted in the greenhouse on 11/11/85 and harvested on 3/10 - 3/12/86, and hundreds of clones were selected. The top 57 selections were stored in the lab at 76-78° F until sent to Mr. Gene Shaver at Scottsbluff, Nebraska and planted in mid-May. These same clones were planted in Louisiana on 8/26/86. The following clones did well at both locations: 62-9, 62-10, 62-11, 61-21, 61-29, 61-33, 61-39, 61-42, and 61-50. This is the first year that we have assigned permanent numbers to our clones in the greenhouse. Other permanent numbers were designated at harvest this fall in the field, which included 62-58 through 62-179.

Louisiana, Table 1. Regional trial summary sheet - 1986.

Selection No. or Variety	Aver. Mat.	1/ Representa- tive Area-Type	Most ^{2/}		CWT/A Aver. Yield US #1	Aver. Percent US #1	Aver. Total Solids	Gen. Merit Rating	3/ Chip Color	Comments and General Notes
			CWT/A Aver. Yield	CWT/A Aver. Yield						
EARLY										
Norland	1	0	181	154	85.1	15.2			8	Nice tuber type
ND 651-9	3	T-1	201	153	76.1	15.2		5	6	Good storage quality
ND 860-2	3	T-1	181	142	78.5	16.7		4	3	
W832	3	T-1	149	125	83.9	18.2			4	
MEDIUM TO LATE										
MS700-83	3	T-1	185	152	82.2	15.6			4	
MS704-10	3	T-1	118	96	81.4	17.7			3	Yellow flesh
MN12161	4	T-1	147	105	71.4	15.8			4	
MN12567	3	T-1	232	158	68.1	15.2		3	8	Nice type
MN82328	4	T-1	150	122	81.3	16.0			5	Pink eyes
NE165.75-2	4	T-1	70	46	65.7	16.0			8	Red
NEA71.72-1	2	0	165	115	69.7	15.2			6	Good storage quality
BN9803-1	3	T-1	130	100	76.9	16.9			5	Good storage quality
ND671-4Russ	4	T-1	157	122	77.7	15.2			7	Nice russet
NDT9-1068-11R	5	0	208	182	87.5	15.2		1	6	Good storage quality
W879	4	0	173	153	88.4	16.7		2	3	Nice type
W948R	3	0	148	101	68.2	15.2			4	Excellent storage ability, Nice type
Red Pontiac	4	0	210	171	81.4	15.2			8	
Russet Burbank	5	0	114	63	55.3	15.2			7	Poor shape
Norgold Russet	2	T-1	186	149	80.1	15.4			8	Nice type
Norchip	4	T-1	100	70	70.0	16.5			4	
La12-59			No Northern Seed Available.							

1/ 1-Very Early-Norland maturity; 2-Early-Irish Cobbler maturity; 3-Medium-Red Pontiac maturity;
4-Late-Katahdin maturity; 5-Very Late-Kennebec or Russet Burbank maturity.

2/ AREA - T-less than 1%; 1 - 1020%; 2 - 21-40%; 3 - 41-60%; 4 - 61-80; 5 - 81-100%. TYPE - 1. Small, superficial; 2. Larger, superficial; 3. Larger, rough pustules; 4. Larger pustules, shallow holes; 5. Very large pustules, deep holes.

3/ Place top five among all entries including check varieties; disregard maturity classification.

4/ Chip Color - PCII Color Chart or Agron.

Louisiana, Table 2. Regional trial grade defects - 1986.

Selection No. or Variety	Scab ^{1/}	Growth Cracks	Second Growth	Sun Green	Tubers Free of External Defects	Hollow Heart	Internal Necrosis	Vascular Discoloration	Normal ^{3/} Tubers
EARLY									
Norland	0	2	0	0	98	0	0	4	96
ND 651-9	2	0	0	0	98	0	2	0	98
ND 860-2	4	2	2	4	88	0	0	0	100
W832	10	0	0	2	88	0	2	0	98
MEDIUM TO LATE									
MS700-83	8	2	0	2	88	0	4	2	94
MS704-10	10	2	0	2	86	0	0	0	100
MN12161	22	0	0	0	78	0	0	4	96
MN12567	2	0	2	2	94	0	0	0	100
MN82328	4	0	0	0	96	0	0	0	100
NE165.75.2	6	0	0	0	94	0	2	10	88
NEA71.72-1	0	0	0	2	98	0	0	0	100
BN9803-1	8	2	0	8	82	0	0	2	98
ND671-4Russ	4	0	0	0	96	2	2	0	96
NDT9-1068-11R	0	8	0	0	92	0	0	0	100
W879	0	2	4	4	90	0	0	0	100
W948R	0	2	0	0	98	0	4	0	96
Red Pontiac	0	0	6	0	94	0	0	0	100
Russet Burbank	0	0	30	0	70	0	0	2	98
Norgold Russet	2	2	6	2	88	0	0	0	100
Norchip	8	0	6	2	84	0	0	0	100
La12-59	No Northern Seed Available								

1/ Includes all tubers with scab lesions whether merely surface, pitted, or otherwise and regardless of area. Be sure to count tubers with any amount of scab in this category.

2/ This total - tubers free from any external defect of any sort.

3/ Percentage normal tubers are those showing no internal defects. Some individual tubers will have more than one type of internal defects.

Louisiana, Table 3. Source of seed experiment planted on March 6, 1986 and harvested on June 3, 1986 at LSU Ben Hur Farm.

	CWT/A Av. Yield U.S. #1	CWT/A Av. Yield Total	Specific Gravity	Chip ^{1/} Color
(1) 43-18 ^{2/}	57.2	89.3	1.062	4
(2) Red Ngrland ^{2/}	101.2	136.8	1.059	4
(3) 12-59 ^{2/}	81.4	111.8	1.061	5
(4) LaChipper ^{2/}	92.0	123.2	1.065	4
(5) 01-38 ^{2/}	132.0	159.7	1.066	4
(6) Red LaSoda ^{2/}	144.3	192.7	1.059	7
(7) Red LaSoda ^{3/}	174.2	195.8	1.059	6

^{1/} Chip Color - color chart 1 = best (very white), 10 = very dark brown - chipped on 6/26/86.

^{2/} Tubers used as a seed source were planted in Louisiana on March 12, 1985 and harvested June 20, 1985, then stored at 40°F-85% relative humidity till cut on March 4, 1986 and planted on March 6, 1986.

^{3/} Tubers used as a seed source were grown in Nebraska and probably planted in May, 1985 and harvested in September, 1985. This seed was purchased from a local seed store in February, 1986, cut on March 4, 1986, and planted on March 6, 1986.

Louisiana, Table 4. Other notes on source of seed experiment planted on March 6, 1986 and harvested on June 3, 1986 at LSU Ben Hur Farm.

	5/30/86 Vigor ^{1/} Rating	5/30/86 Maturity ^{2/} Rating	Percent External Defects ^{3/}			
			scab	growth cracks	second growth	sun green
(1) 43-18 ^{4/}	5	5	7	1	2	0
(2) Red Norland ^{4/}	3	1	0	1	0	1
(3) 12-59 ^{4/}	4	4	3	2	1	0
(4) LaChipper ^{4/}	3	3	3	0	0	1
(5) 01-38 ^{4/}	3	3	12	1	2	3
(6) Red LaSoda ^{4/}	4	5	0	0	2	0
(7) Red LaSoda ^{5/}	4	5	1	5	0	0

1/ 1 = weak vigor, 3 = medium vigor, 4 = vigorous, 5 = very vigorous.

2/ 1 = very early, 3 = medium maturity, 4 = late, 5 = very late.

3/ taken at harvest.

4/ Louisiana-grown.

5/ Nebraska-grown.

Louisiana, Table 5. Spacing test - Red LaSoda planted 3/6/86 - harvested 6/3/86 - 20-foot plots, four replications.

			CWT/A Av. Yield U.S.#1	CWT/A Av. Yield Total	Growth Cracks %	Second Growth %	Specific Gravity	Chip ^{1/} Color
(1)	12" spacing	20 seed-pieces	214	250	0	4	1.059	7
(2)	16" spacing	15 seed-pieces	191	226	12	0	1.059	7
(3)	20" spacing	12 seed-pieces	180	210	4	0	1.059	7
(4)	24" spacing	10 seed-pieces	154	181	8	16	1.059	7

^{1/} Chip Color - 1 = best (very white), 10 = very dark brown, chipped on 6/26/86.

Louisiana, Table 6. Selected lines grown in La. in 1985. Planted 3/12/85 - harvested 6/20/85 - stored at 40°F till cut on 3/4/86 and planted 3/6/86 at Ben Hur.

No.	lbs/20' #1	lbs/20' #2	Specific Gravity	Chip ^{1/} Chip	Remarks
(1) 01-41	8.0	3.5	1.066	4	scab
(2) 10-47	17.0	16.5	1.059	4	scab
(3) 23-26	4.0	3.5	1.059	4	
(4) 21-37	13.0	15.0	1.061	4	scab
(5) 21-46	17.5	1.5	1.059	3	good
(6) 21-75	11.0	7.0	1.061	4	
(7) 21-77	8.5	3.0	1.059	5	
(8) 21-113	4.0	4.0	1.059	3	
(9) 31-88	12.5	15.0	1.060	4	
(10) 31-94	6.0	8.0	1.059	4	scab, good storage, little green
(11) 31-100	17.0	3.0	1.068	3	good
(12) 31-120	6.5	4.0	1.066	4	
(13) 31-131	14.5	4.5	1.062	4	good, good storage
(14) 31-211	9.0	1.5	1.068	4	scab, little green
(15) 41-2	25.0	8.5	1.065	3	very good, good storage
(16) 41-5	14.5	14.0	1.061	4	good storage
(17) 41-25	19.5	5.0	1.071	3	good
(18) 41-32	10.5	15.5	1.071	4	
(19) 41-50	25.0	9.0	1.063	3	very good
(20) 41-52	12.5	9.5	1.063	3	little green
(21) 41-53	22.0	8.0	1.059	9	very good
(22) 41-67	35.5	14.0	1.061	5	very good
(23) 41-68	14.0	3.5	1.059	7	good, check storage, still white
(24) 41-69	25.0	6.0	1.061	6	
(25) 41-88	12.0	9.0	1.072	6	

^{1/} Chip Color - 1 = best (very white), 10 = very dark brown - chipped 6/26/86.

Maine

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Introduction: Thirty-nine potato varieties and clones were tested at Aroostook Farm, Presque Isle, Maine during the 1986 growing season. This test was conducted as part of the NE107 Regional Project (Breeding and Evaluation of Potato Clones for the Northeast).

Methods: Single row plots, 25 feet long were planted on May 15 using a randomized complete block design and six replications. Plots were located on a Caribou gravelly loam soil of pH 4.8. Fertilization consisted of 1000 lbs/A of 14-14-14, banded at planting. Cultural practices were similar to those used on farms in the area and date of vine kill was based on maturity classification of the cultivars. Specific gravity was determined using the weight in air, weight in water method. Hollow heart ratings indicate the number of hollow tubers observed per 60 large tubers examined. Chip and french fry tests were conducted during early December following storage at 50°F. Chips were fried at 375°F until bubbling stopped and evaluated based on Potato Chip Institute Color Chart 1206-U. French fries were fried at 375°F for 4 min. and evaluated based on the USDA Color Standards for Frozen French Fried Potatoes (1978 Edition).

Results: Weather conditions during 1986 were considerably cooler than normal resulting in delayed maturation for many cultivars. Rainfall until mid-July was 50 percent below normal, while rainfall from mid-July through harvest was 120 percent or more above normal. Overall, yields were only fair and quality problems developed as a result of wet growing conditions during tuber bulking. Early blight may have been a severe problem for B9540-55, NemaRus, and AF522-1. Within the early test, CS7639-1 and CS7697-24 produced outstanding yields (Maine Table 1). These clones plus CF7679-15, CS7296-5, F70021, and NY79 produced acceptable yields when compared to Superior. Tuber appearance for fresh market was acceptable for most clones; however, CF7679-15, CS7697-24, and F70021 stood out as particularly attractive (Maine Table 2). Appearance of AF339-5 was unacceptable. Only NY79 was acceptable as a chipping variety.

Within the medium trial, marketable yields of AF474-2, F74123, and WF591-1R were particularly outstanding (Maine Table 3). Only AF465-2 produced marketable yields which were significantly lower than Kennebec. Tuber size was quite small in AF465-2 and W752. Tuber appearance for fresh market was particularly outstanding for AF474-2,

AF465-2, and AF522-5 (Maine Table 4). Appearance of WF591-1R was considered poor. Hollow heart was a problem in AF465-2. Chip color was poor for most clones and even the best clone, B9340-13, was marginal.

Several clones produced outstanding yields within the late trial (Maine Table 5). Marketable yield of the standard variety, Katahdin, was relatively low due to sunburning. Marketable yields were particularly high for NY72, CS7635-4, NY71, and NY81 and particularly low for Shepody.

Tuber appearance was rated good for all clones except Shepody and AF522-1 (Maine Table 6). Shepody and AF522-1 produced a high percentage of misshapen tubers, while NY71 had sunburn problems. Chip colors were poor for most clones and marginal for the two best clones, NY76 and NY81.

Within the russet/long trial, marketable yields of Russette, A76147-2, A72685-2, and Russet Burbank were highest while that of B9540-55 was particularly low (Maine Table 7). Tuber sizes were excessively large in A76147-2 and small in B9540-55 and B9596-2. Most clones were rated near Russet Burbank in appearance; however, Russette and A76147-2 were rated considerably higher (Maine Table 8). Tuber defects were relatively common in all clones. Hollow heart was a problem in A76147-2 and a severe problem in Russette. French fry colors were generally quite dark; however, acceptable fry colors were obtained with B9540-55, NemaRus, and A7411-2.

French fry color and texture of 17 varieties and clones were evaluated under simulated processing conditions by the Department of Food Science, University of Maine; Orono (Maine Table 9). Considering color, length, and especially texture only five selections (Norking Russet, Shepody, A7411-2, AF522-1, and AF522-5) were judged equal to or better than Russet Burbank in french fry quality.

Limited data on storage and processing characteristics were collected from 40 varieties and clones grown during the 1985 growing season (Maine Table 10). Only CF77154-10 produced acceptable potato chips from 38°F storage, while only CF77154-10 and W752 demonstrated acceptable reconditioning ability from 38°F storage. After cooking darkening scores were poorer than Katahdin for the following selections: NemaRus, Russet Burbank, Superior, A7411-2, AF465-2, AF474-2, B9540-55, B9569-2, and NY64. Washed appearance ratings were particularly outstanding for CS7635-4, CF7750-1, GoldRus, Elba, and CS7639-1. Selections with the lowest storage weight losses were Russet Burbank, CS7635-4, NY64, B9596-2, and WF591-1R.

Maine Table 1. Yield, marketable yield, percentage of yield by grade size distribution, and specific gravity for early varieties grown at Presque Isle, Maine - 1986.

Variety	Total Yield cwt/A	Marketable Yield percentage cwt/A	Size Distribution by Class (%)						Size Distribution (%)		Spec. Grav.	
			1	2	3	4	5	6	1-7/8 to 4 in.	2-1/2 to 4 in.		
Early Test-99 days												
Superior (std)	256	235	100	2	18	39	38	3	0	98	41	77
AF339-5	214	195	83	2	7	14	54	23	0	98	77	72
B9569-2	216	204	87	43	52	5	0	0	-	5% over 8 oz		74
CF7679-15	238	221	94	2	12	23	54	9	0	98	63	81
CS7296-5	244	226	96	1	17	34	47	1	0	99	48	72
CS7639-1	302	278	118	2	11	24	55	8	0	98	63	68
CS7697-24	293	272	116	2	15	27	48	8	0	98	56	68
F70021	250	232	99	3	23	31	38	5	0	97	43	66
NY79	225	216	92	3	20	34	39	4	0	97	43	70
Waller Duncan LSD (K=100)	47	46										2

Size classes for all varieties except B9569-2: 1=1-1/2 to 1-7/8"; 2=1-7/8 to 2-1/4"; 3=2-1/4 to 2-1/2"; 4=2-1/2 to 3-1/4"; 5=3-1/4 to 4"; 6=over 4". B9569-2: 1=0 to 4oz; 2=4 to 8oz; 3=8 to 12oz; 4=12 to 16oz; 5=over 16oz.

Maine Table 2. Plant size, maturity at vinekill, tuber shape, tuber defects, hollow heart ratings, chip color, and french fry color for early varieties grown at Presque Isle, Maine - 1986.

Variety	Plant Data ¹		Tuber Data ¹		Tuber Defects (%)				Hollow Heart Rating	Chip Color ²	French Fry Color
	Size Matur. at 7-23 Vinekill		Shape	Appear-ance	Total	Sun- burn	Mis- shapen	Growth cracks			
Early Test-99 days											
Superior (std)	6	6	1	5	6.5	1.0	4.0	1.5	0	8.4	2.9
AF339-5	3	9	3	3	7.3	1.6	4.1	1.6	0	9.6	3.6
B9569-2	5	6	5	5	5.4	0.7	3.7	1.0	0	10.0	4.2
CF7679-15	5	6	1	8	4.9	2.9	0.8	1.2	1	9.4	3.2
CS7296-5	5	7	4	5	6.7	2.6	3.2	0.9	0	8.9	3.0
CS7639-1	7	7	2	6	6.6	1.1	2.8	2.7	1	10.0	4.9
CS7697-24	7	6	3	7	4.9	1.3	1.6	2.0	0	9.6	3.9
F70021	6	4	2	7	4.7	1.4	3.3	0.0	0	9.3	3.6
NY79	4	4	1	6	1.0	0.4	0.6	0.0	0	6.5	1.6

¹See standard NE 107 rating system for key to codes.

²Chip color: 1-7 acceptable, >7 unacceptable; Waller Duncan LSD = 0.3.

³French fry color: 1-3 acceptable, >3 unacceptable; Waller Duncan LSD = 0.4.

Maine Table 3. Yield, marketable yield, percentage of yield by grade size distribution, and specific gravity for medium varieties grown at Presque Isle, Maine - 1986.

Variety	Total Yield cwt/A	Marketable Yield percentage cwt/A	Size Distribution by Class (%)						Size Distribution (%)		Spec. Grav.	
			1	2	3	4	5	6	1-7/8 to 4 in.	2-1/2 to 4 in.		
Medium Test-110 days												
Kennebec (std)	305	257	100	1	8	22	57	12	0	99	69	76
Superior	288	263	102	2	17	28	48	4	1	97	52	78
AF465-2	238	219	85	5	24	36	33	2	0	95	35	85
AF474-2	301	289	112	2	9	19	61	9	0	98	70	76
AF522-5	273	256	100	4	23	32	40	1	0	96	41	86
B9340-13	271	254	99	3	18	33	43	3	0	97	46	77
CF7750-1	262	242	94	3	17	27	46	7	0	97	53	77
CS77120-8	331	275	107	4	18	24	47	7	0	96	54	75
F74123	318	290	113	3	12	21	56	7	1	96	63	76
W752	264	241	94	6	25	41	25	3	0	94	28	91
WF591-1R	316	290	113	2	11	30	49	8	0	98	57	79
Waller Duncan LSD (K=100)	35	36										4

Size classes: 1=1-1/2 to 1-7/8"; 2=1-7/8 to 2-1/4"; 3=2-1/4 to 2-1/2"; 4=2-1/2 to 3-1/4"; 5=3-1/4 to 4"; 6=over 4".

Maine Table 4. Plant size, maturity at vinekill, tuber shape, tuber defects, hollow heart ratings, chip color, and french fry color for medium varieties grown at Presque Isle, Maine - 1986.

Variety	Plant Data ¹		Tuber Data ¹		Tuber Defects (%)			Hollow Heart Rating	Chip Color ²	French Fry Color ³	
	Size Matur. at 7-23 Vinekill		Shape	Appearance	Total	Sun- burn	Mis- shapen				Growth cracks
Medium Test-110 days											
Kennebec (std)	8	5	4	5	15.2	10.2	2.4	2.6	1	8.0	2.4
Superior	6	2	2	6	6.7	1.2	4.5	1.0	0	8.4	2.6
AF465-2	3	6	5	7	3.4	0.3	3.0	0.1	10	8.7	3.0
AF474-2	5	6	4	8	2.2	1.0	1.2	0.0	1	9.4	3.6
AF522-5	5	7	6	7	2.2	0.0	2.0	0.2	4	10.0	3.7
B9340-13	4	3	2	5	3.6	1.0	1.9	0.7	0	7.6	2.5
CF7750-1	5	5	5	4	4.3	0.5	2.8	1.0	0	8.0	3.4
CS77120-8	6	3	3	5	13.4	4.4	1.3	7.7	1	8.9	2.6
F74123	5	8	4	5	5.3	1.8	2.7	0.8	0	10.0	4.2
W752	6	4	2	6	3.2	0.6	2.4	0.2	0	8.1	2.0
WF591-1R	6	7	4	3	6.6	0.5	5.1	1.0	0	9.6	3.7

¹See standard NE 107 rating system for key to codes.

²Chip color: 1-7 acceptable, >7 unacceptable; Waller Duncan LSD = 0.4.

³French fry color: 1-3 acceptable, >3 unacceptable; Waller Duncan LSD = 0.3.

Maine Table 5. Yield, marketable yield, percentage of yield by grade size distribution, and specific gravity for late varieties grown at Presque Isle, Maine - 1986.

Variety	Total Yield cwt/A	Marketable Yield percentage cwt/A	Size Distribution by Class (%)						Size Distribution (%)		Spec. Grav.	
			1	2	3	4	5	6	1-7/8 to 4 in.	2-1/2 to 4 in.		
Late Test-120 days												
Katahdin (std)	319	255	100	3	8	14	52	22	1	96	74	79
Norking Russet	277	260	102	23	56	17	3	1	-	21% over	8 oz	85
Shepody	306	225	88	10	38	32	14	6	-	52% over	8 oz	80
AF522-1	325	281	110	19	64	14	3	0	-	17% over	8 oz	84
CS7635-4	349	316	124	3	11	19	52	14	1	96	66	79
ND534-4	295	277	109	14	41	34	9	2	-	45% over	8 oz	77
NY71	364	306	120	2	4	11	50	30	3	95	80	80
NY72	442	386	151	3	10	19	53	13	2	95	66	84
NY76	309	282	111	5	26	26	39	4	0	95	43	73
NY81	336	296	116	2	6	16	50	25	1	97	75	80
Waller Duncan LSD (K=100)	30	34										3

Size classes for Katahdin, CS7635-4, NY71, NY72, NY76, and NY81: 1=1-1/2 to 1-7/8"; 2=1-7/8 to 2-1/4"; 3=2-1/4 to 2-1/2"; 4=2-1/2 to 3-1/4"; 5=3-1/4 to 4"; 6=over 4". Size classes for Norking Russet, Shepody, AF522-1, and ND534-4: 1=0 to 4 oz; 2=4 to 8 oz; 3=8 to 12 oz; 4=12 to 16 oz; 5=over 16 oz.

Maine Table 6. Plant size, maturity at vinekill, tuber shape, tuber defects, hollow heart ratings, chip color, and french fry color for late varieties grown at Presque Isle, Maine - 1986.

Variety	Plant Data ¹		Tuber Data ¹		Tuber Defects (%)				Hollow Heart Rating	Chip Color ²	French Fry Color ³
	Size Matur. at 7-23 Vinekill	at	Shape	Appear-ance	Total	Sun- Mis-		Growth cracks			
						burn	shapen				
<u>Late Test-120 days</u>											
Katahdin (std)	7	6	3	6	17.2	15.7	0.8	0.7	5	9.1	3.5
Norking Russet	4	5	5	7	4.8	0.2	3.6	1.0	4	8.5	2.7
Shepody	6	5	8	4	21.9	5.4	16.1	0.4	4	9.1	3.5
AF522-1	5	3	6	4	14.0	1.1	12.8	0.1	0	9.3	3.5
CS7635-4	7	9	3	7	6.0	1.6	2.5	1.9	2	8.8	3.0
ND534-4	4	3	7	8	4.7	0.5	4.2	0.0	3	9.2	3.5
NY71	6	6	3	7	12.1	8.9	2.6	0.6	3	8.1	1.6
NY72	8	7	2	7	8.2	6.0	1.2	1.0	3	9.1	3.1
NY76	7	6	3	7	3.4	1.4	2.0	0.0	0	7.2	1.2
NY81	5	6	2	3	9.6	4.9	1.4	3.3	2	7.8	1.7

¹See Standard NE 107 rating system for key to codes.

²Chip color: 1-7 acceptable, >7 unacceptable; Waller Duncan LSD = 0.4.

³French fry color: 1-3 acceptable, >3 unacceptable; Waller Duncan LSD = 0.3.

Maine Table 7. Yield, marketable yield, percentage of yield by grade size distribution, and specific gravity for russeted varieties grown at Presque Isle, Maine - 1986.

Variety	Total Yield cwt/A	Marketable Yield percentage cwt/A	Size Distribution by Class (%)					Size Distribution (%)		Spec. Grav.	
			1	2	3	4	5	Over 8 oz.	Over 12 oz.		
Russet Test - 130 days											
Russet Burbank (std)	298	237	100	29	46	20	5	0	25	5	85
NemaRus	266	224	94	22	50	21	6	1	28	7	76
Russette	290	257	108	25	50	16	8	1	25	9	90
A7411-2	238	202	85	21	54	18	5	2	25	7	83
A72685-2	315	244	103	23	49	18	8	2	28	10	89
A75188-3	258	218	92	28	46	20	6	0	26	6	74
A76147-2	431	254	107	5	24	25	26	20	71	46	84
B9540-55	200	156	66	39	56	5	1	0	6	1	70
B9596-2	217	191	81	29	59	9	2	1	12	3	77
Waller Duncan LSD (K=100)	52	47									4

Size classes for all varieties: 1 = 0 to 4 oz; 2 = 4 to 8 oz; 3 = 8 to 12 oz; 4 = 12 to 16 oz; 5 = over 16 oz.

Maine Table 8. Plant size, maturity at vinekill, tuber shape, tuber defects, hollow heart ratings, chip color, and french fry color for russeted varieties grown at Presque Isle, Maine - 1986.

Variety	Plant Data ¹		Tuber Data ¹		Tuber Defects (%)				Hollow Heart Rating	Chip Color ²	French Fry Color
	Size Matur. at 7-23 Vinekill	Shape	Appear-ance	Total	Sun- burn	Mis- shapen	Growth cracks				
Russet Test-130 days											
Russet Burbank	7	5	7	5	19.8	1.3	17.1	1.4	2	8.5	3.1
NemaRus	6	2	8	6	14.9	1.1	13.5	0.3	1	8.6	2.5
Russette	5	5	6	8	10.6	1.4	6.2	3.0	21	9.5	3.5
A7411-2	5	4	7	5	14.9	0.2	12.4	2.3	0	9.0	2.8
A72685-2	7	4	6	6	20.2	5.2	14.8	0.2	5	9.5	3.5
A75188-3	5	5	6	6	15.5	3.2	3.2	9.1	2	9.8	3.9
A76147-2	8	5	7	7	26.9	12.5	11.5	2.9	10	9.7	3.8
B9540-55	4	2	8	5	22.9	2.2	19.7	1.0	0	8.0	2.2
B9596-2	4	2	8	5	11.7	2.4	8.1	1.2	0	9.7	3.8

¹See standard NE 107 rating system for key to codes.

²Chip color: 1-7 acceptable, >7 unacceptable; Waller Duncan LSD = 0.5.

³French fry color: 1-3 acceptable, >3 unacceptable; Waller Duncan LSD = 0.4.

Maine Table 9. French fry color and texture of selected potato clones and varieties under simulated processing conditions¹. All varieties were grown at Presque Isle, Maine during 1986.

Variety	Color Grade ²	Crispness ³		Mealiness ⁴		Comments ⁵	Overall Texture Rating ⁶
		Index	% Limp	Index	% Soggy		
NemaRus	0	3.0	28	3.1	40	Gr	-
Norking Russet	00	3.6	8	3.9	18		+
Russet Burbank (std)	0	3.1	19	3.7	16		0
Russette	1	3.4	10	3.8	21	Gr	0
Shepody	0	3.4	14	3.8	17		0
Superior (std)	0	3.4	5	3.7	16	Sh	0
A7411-2	1	3.2	16	3.6	21		0
A72685-2	1	3.3	11	3.7	20	Ir	0
A75183-3	2	2.8	34	2.7	48	Ir	-
A76147-2	2	2.7	38	2.6	50	Ir	-
AF339-5	1	3.4	12	3.6	19	Ir	0
AF465-2	00	3.2	16	3.2	34		-
AF522-1	1	3.4	11	3.8	11		0
AF522-5	1	3.4	11	4.0	10		0
B9540-55	0	2.8	42	2.8	42		-
B9596-2	1	3.1	12	3.7	22	Ir	0
W752	00	3.7	1	4.2	5	Sh	+
Waller Duncan							
LSD (K=100)		0.4		0.5			

¹Four inside and four outside raw tuber slices were cut from each of five tubers. The slices were rinsed in cool water, blanched for 8 min at 170°F, par fried at 375°F for 80s, and quick frozen at -30°C in plastic bags. Four such replications were processed and held at -15°C until evaluation. Prior to

continued . . .

Maine Table 9 - continued. French fry color and texture of selected potato clones and varieties under simulated processing conditions¹. All varieties were grown at Presque Isle, Maine during 1986.

evaluation, samples were finish fried at 360°F for 2-1/2 min., blotted dry with a paper towel, and cooled 6 min. Only results from the inside slices are presented. All samples were processed and evaluated by the Department of Food Science (R. True and T. Work), University of Maine; Orono, ME. Processing was conducted on November 18. Evaluations were conducted on November 25 and December 11. All tuber samples were stored at 50°F, 85% R.H. from harvest until processing.

²Color Grades are from U.S.D.A. color standards chart #64-1, third edition.

³Crispness indices represent weighted means derived from the following evaluation scale: 5 = very crisp; 4 = crisp; 3 = firm; 2 = limp; 1 = very limp. Percent limp indicates the percentage of slices which were rated as limp or very limp.

⁴Mealiness indices represent weighted means derived from the following evaluation scale: 5 = dry, mealy; 4 = mod. mealy, slightly moist; 3 = slightly mealy, mod. moist; 2 = soggy, not mealy; 1 = very soggy, not mealy. Percent soggy indicates the percentage of slices which were rated as soggy or very soggy.

⁵Comments: Gr = french fries were slightly gray in color.

Sh = french fries were very short; round variety.

Ir = french fries were irregular in color; dark blotches detracted from appearance of the product.

⁶Overall texture rating: + texture rated significantly better than Russet Burbank.
0 texture rated not significantly different from Russet Burbank.
- texture rated significantly poorer than Russet Burbank.

Maine Table 10. Chip color from 38°F storage, potential for reconditioning, after cooking darkening indices, relative appearance indices, total preparation losses, days to sprout formation (length of dormancy), and storage weight losses at 38 and 50°F for 40 potato varieties grown at Presque Isle, Maine during 1985 and stored during the 1985-1986 storage season.

Variety	Process. from 38°F		After Cooking ³ Darkening ³	Washed Appearance Index ⁴	Total Prep. ⁵ Losses	Days to Indicated Sprout Length ⁶		Storage Wt. Loss (%) ⁷	
	Chip Color ¹	Recond. ²				Pip	1 1/2 Inch	38°F	50°F
Elba	10.0	-	7.1	88.3	5.8	115	178	4.9	7.5
GoldRus	10.0	-	7.6	89.9	9.7	73	101	5.8	9.4
Hampton	10.0	-	7.9	85.9	8.9	94	135	3.9	7.9
Katahdin	10.0	-	7.1	76.8	7.7	87	115	4.7	9.5
Kennebec	10.0	neg.	7.4	73.6	8.5	121	141	4.8	8.3
NemaRus	10.0	-	6.7	79.4	9.4	67	101	5.5	12.8
Norking Russet	10.0	neg.	7.1	83.7	9.3	113	183	3.5	8.0
Redsen	9.9	-	7.4	78.7	8.0	129	156	6.8	12.3
Rhine Red	10.0	-	7.4	81.8	7.3	128	191	4.8	8.8
Russet Burbank	10.0	neg.	6.8	66.8	11.3	121	176	3.7	4.4
Shepody	10.0	-	7.4	42.7	11.6	113	133	3.1	7.1
Superior	9.8	neg.	6.9	76.8	8.1	104	132	5.2	11.7
A7411-2	10.0	-	6.9	76.9	7.0	73	108	5.0	7.6
A72685-2	10.0	-	7.3	74.4	10.2	73	101	4.8	9.0
AF339-5	10.0	-	7.0	67.0	13.8	102	143	8.0	11.9
AF465-2	10.0	-	6.7	76.7	8.5	90	132	5.5	13.7
AF474-2	10.0	-	6.8	82.7	10.9	92	127	4.1	17.1
AF9058-M	10.0	-	Yel. Flesh		6.7	100	141	4.0	7.1
B9140-32	9.7	fair	7.6	84.5	7.9	94	135	5.6	13.8
B9340-13	8.4	fair	7.1	84.0	9.7	98	132	5.4	12.8
B9540-55	9.8	neg.	6.8	78.4	10.2	59	108	4.6	10.7
B9569-2	10.0	-	6.6	83.8	8.8	94	143	5.4	14.3
B9596-2	10.0	-	7.4	73.1	12.9	94	176	4.0	6.6
CF7679-15	10.0	-	7.6	85.8	9.8	125	152	5.0	8.5
CF7750-1	10.0	-	7.5	91.3	4.8	90	125	7.3	13.8
CF76183-2	9.1	fair	7.5	75.5	10.2	81	115	5.3	11.7

Maine Table 10 - continued

Variety	Process. from 38°F		After Cooking ³ Darkening ³	Washed Appearance Index ⁴	Total Prep. Losses ⁵	Days to Indicated Sprout Length ⁶		Storage Wt. Loss (%) ⁷	
	Chip Color ¹	Recond. ²				Pip	1/2 Inch	38°F	50°F
CF77154-10	7.3	good	7.9	80.5	8.0	122	143	5.8	16.7
CS7296-5	10.0	-	7.6	62.0	10.3	111	139	5.3	9.2
CS7635-4	10.0	neg.	7.4	93.6	8.3	122	190	4.6	6.3
CS7639-1	10.0	-	7.7	87.1	7.2	125	152	5.2	9.6
CS7697-24	10.0	-	7.2	67.6	6.4	108	143	6.0	12.4
CS7747-7	10.0	-	7.6	73.2	18.5	77	118	6.7	15.9
CS73105-2R	10.0	-	7.0	85.9	9.1	94	114	4.3	7.2
CS77120-8	10.0	-	7.5	78.7	7.1	100	141	4.8	9.9
F70021	10.0	-	7.4	68.7	6.0	62	104	7.4	18.7
F74123	10.0	-	Yel. Flesh	79.5	4.3	73	100	5.2	7.6
ND534-4	10.0	-	7.3	82.8	5.3	120	183	4.0	7.0
NY64	10.0	-	6.9	85.1	9.9	108	135	3.6	6.3
W752	9.4	good	7.1	86.8	11.2	100	135	5.3	17.7
WF591-1R	10.0	-	7.6	76.3	9.9	121	148	4.1	6.6

¹Stored at 38°F, 85% R.H. from harvest. Chip colors: 1-7 acceptable, >7 unacceptable.

²Reconditioned samples were placed at 70°F for a 3 wk period starting on January 22, 1986. Chip color rating scale: 1-7 = good; 7-8 = fair; 8-9 = neg.; 9-10 = -.

³Samples were stored at 45°F, 85% R.H. from harvest until January 19, 1986 and were then warmed to 65°F for 96 h. Diced tubers were blanched for 5 min, cooled to 120°F, then rated after 30 min with a Munsell Neutral Color Scale. Higher indices indicate lighter color.

⁴Relative scale based on tuber shape, uniformity, skin texture, and external blemishes. Higher indices indicate better appearance.

⁵Samples were peeled for two minutes in a Univex H-200 abrasive peeler and were then pared by hand.

⁶Tubers were stored at 45°F, 85% R.H.

⁷Percentage sprout and weight loss following storage from harvest until April 6 at indicated temperature and 85% R.H.

Alvin F. Reeves, Robert B. Long, and Garland S. Grounds

Potato Breeding

Seed and seedling production. As in past years crosses were directed toward three goals: a long russet processing variety; a round white table variety; and a chipping variety. Scab resistance is emphasized in all crosses. A total of 34 parent plants were intercrossed in 38 different combinations to produce 32,345 seeds. An additional 811,900 seeds were obtained from field plantings of 17 russet and one chip selection. Greenhouse plantings of true seeds yielded 59,940 seedlings from which 45,326 tubers were harvested.

Seedling selection. A total of 245 (0.65%) new selections were saved from 37,794 single hills. From the 381 12-hill plots, 34 (8.9%) were saved for further testing. Sixteen of these were russets, 18 round whites. Thirteen 60-hill plots, 39 advanced selections, and 23 Campbell selections were maintained and tested.

Protoclonal selections. Field testing of 119 clones derived from Russet Burbank leaf cells included replicated yield tests of 36 of the advanced protoclones. Twelve were equal to the standard Russet Burbank in yield, and three were equal in specific gravity.

Disease tests. In cooperation with Drs. Franklin Manzer, Richard Storch, Bill Brodie, Robert Goth, Gilbert Banville and Simeon Leach, a number of selections were tested for resistance to several diseases. All tests were inoculated either directly or on spreader rows within the plots. Results were as follows: 11 of 50 selections tested were highly resistant to early blight; 10 of 55 to late blight; 26/67 to acid scab; 57/81 to common scab; 52/81 to net necrosis; 4/19 to leafroll; 19/26 to verticillium; 6/25 to golden nematode; 2/15 to Fusarium roseum; and 1/5 to ring rot.

Physiological disorders. Additional tests for physiological disorders showed 13 of 32 resistant to hollow heart; 2/9 to blackspot bruising; and 1/9 to shatter bruising.

Yield tests. A total of 87 selections were grown in replicated yield tests in 1986. Thirty-six yielded better than the control varieties and 34 had higher specific gravities. Nine selections were better than the controls for both qualities. Early maturing selections were given 120 pounds of nitrogen per acre and killed at 90 days from planting. Medium maturity selections were given 140 pounds of nitrogen and killed at 102 days; medium-late maturing selections were given 160 pounds of nitrogen and killed at 109 days.

Chip tests. After processing in December and February from four different storage temperatures, six selections and Allagash Russet had better chip color than Monona: AF 236-1, AF 874-8, AF 875-16, AF 897-21, AF 1022-1 and CS 7232-4.

Processing tests. Ruth True and Terry Work (Food Sciences Department of the University of Maine in Orono) conducted french fry tests of nine selections. Two (AF 236-1 and AF 465-2) had better color than Russet Burbank, and four (AF 339-5, AF 522-1, AF 994-6 and AF 1058-8) had better texture ratings than Russet Burbank.

Grower trials of advanced selections. Seven unnamed selections were grown on commercial farms in 1986: AF 236-1, AF 339-5, AF 465-2, CS 7232-4, CS 7697-24, WF 564-3 and WF 591-1. Poor tuber shape was found in AF 339-5, WF 591-1, WF 564-3 and CS 7697-24. The first three will be discarded; however, one of the two growers had success with CS 7697-24 and will continue to test it.

Russets: AF 465-2 had the best tuber type; however, some hollow heart was noted even in smaller tubers.

Chipping selections: CS 7232-4 continued to have excellent color. Mosaic in the seed source will limit testing next year. AF 236-1 has good chip color and high dry matter. It will be entered in the National Chip Trials in 1987.

Round white table varieties: In addition to CS 7697-24, CS 7635-4 will be tested in 1987.

Table 1 summarizes the advanced selections in the Maine potato breeding program.

Maine Table 1. Characteristics of some advanced selections from the Maine breeding program.

Pedigree	Resistance to 5/										
	Maturity 1/	Skin color 2/	Tuber type 3/	Yield 4/	Cooked quality 4/	Chip color 4/	Percent dry matter 4/	Storage qualities 4/	Bruising 4/	Hollow Heart 4/	Virus X
Round white tablestock											
Early Maturing											
AF901-1	ME	W	RO	E	F	U	G	F	G	M	S
AF909-8	ML	W	R	E	F	M	A	F	E	M	M
AF1011-7	M	W	RO	E	F	G	G	F	E	G	S
CS7639-1	E	W	RO	E	G	U	M	F	A	M	S
CS7685-6	E	WC	RO	G	A	U	G	F	A	E	S
CS7697-24	E	WC	R	E	G	M	A	F	A	A	S
CS78162-12	ME	DC	R	G	F	A	G	F	G	G	S
CS7983-26	ME	WC	RO	G	F	U	M	F	A	E	S
Mid Season											
AF474-2	M	W	O	G	A	U	A	F	M	A	R
AF686-3	ME	C	R	E	A	A	M	F	E	E	S
AF790-1	ML	C	R	G	A	A	A	F	E	E	S
AF828-5	ML	W	RO	G	A	U	M	F	E	E	S
AF1060-2	ML	W	R	E	F	U	G	F	F	F	S
AF1060-6	M	WC	R	G	F	M	G	M	G	E	S
CF7523-1	M(E)	W	RO	E	G	U	A	F	E	E	R
CS76148-18	M	W	R	G	A	U	U	F	A	E	S
CS7910-6	ML	C	R	G	F	A	A	F	G	E	R
Full Season											
CS7635-4	L	W	R	E	E	A	G	F	A	A	S
CS7684-9	M	C	RO	M	E	M	M	F	A	A	R

Maine Table 1. Continued

Pedigree	Resistance to 5/																		
	Maturity 1/	Skin color 2/	Tuber type 3/	Yield 4/	Cooked quality 4/	Chip color 4/	Percent dry matter 4/	Storage qualities 4/	Bruising 4/	Hollow Heart 4/	Virus X	Leafroll	Net necrosis	Late blight	Early blight	Acid scab	Common scab	Verticillium	Golden nematode
Long russet for processing or count box																			
AF465-2	M	R	OL	M	A	M	A	F	E	M	S	S	R	S	S	R	R	S	S
AF522-1	ML	R/W	OL	A	A	U	G	F	A	E	S	R	R	M	S	M	M	M	S
Long white for processing or count box																			
CS7981-7	ML	C	OL	E	A	M	G	F	G	G	S	R	R	S	S	S	S	R	S
CS7984-3	ML	W	OL	A	F	A	E	F	G	M	S	S	R	S	S	R	M	M	S
Chipping type																			
AF236-1	ME	WC	OL	G	A	E	G	A	A	M	S	S	R	R	R	S	S	S	S
AF330-1	E(M)	W	R	A	A	E	G	F	F	A	S	S	R	M	M	S	S	M	S
AF845-11	M	B	R	G	F	G	E	F	F	G	S	S	R	M	M	M	S	S	S
AF874-8	M	W	RO	M	F	E	G	F	F	G	S	S	R	S	S	S	S	S	S
AF875-9	ML	W	R	G	F	G	E	F	F	E	S	S	R	S	S	M	M	M	S
AF875-15	ME	C	R	A	F	G	E	F	F	E	F	S	R	S	S	M	R	M	S
AF875-16	ML	W	R	G	F	E	E	F	F	G	S	S	R	S	S	M	S	R	S
AF875-17	ML	W	R	G	F	G	E	F	F	G	S	S	R	R	S	R	R	S	R
AF879-3	M	W	R	G	F	G	E	F	F	M	S	S	R	S	S	R	S	M	R
AF879-21	M	DC	RO	G	F	E	E	F	F	G	S	S	R	S	M	R	R	S	R
AF1022-1	ME	DC	R	A	F	E	E	F	F	E	F	S	R	S	S	R	R	S	R
CS7232-4	E	WC	R	M	G	E	E	F	G	E	S	F	R	S	S	S	R	S	S

- 1/ E = early, M = medium, L = late.
- 2/ W = white, C = cream, Y = yellow, B = buff, R = russet,
Pu = purple, Re = red, L = light, D = dark.
- 3/ R = round, O = oblong, L = long.
- 4/ Rated as U = unacceptable, M = marginal, A = acceptable,
G = good, E = excellent, F = further testing needed.
- 5/ R = resistant, M = moderately resistant, S = susceptible,
F = further testing needed.

MICHIGAN

R.W. Chase, G.H. Silva, R.B. Kitchen, R. Leep and
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The potato variety evaluation program is designed: (a) to search for improved cultivars well-adapted to Michigan for fresh pack, chip and frozen processing industry; and (b) to conduct intensive evaluations of selected varieties to determine the production management inputs that improve potato quality.

In variety evaluations, special attention was given to quality parameters such as tuber size distribution, appearance, dry matter, internal defects, chip color and after cooking darkening. Other characteristics monitored were overall vigor in relation to emergence and plant stand, resistance to important diseases, notably scab, early blight and tuber bruising. Tuber samples were kept in three storage environments (40, 46, 52° F) for subsequent quality evaluations.

DATES-OF-HARVEST TRIAL

The 1986 dates-of-harvest trial was conducted at the Montcalm Research Farm. Eighteen selected varieties were tested for their marketable maturity and adaptability to Michigan. These included nine released varieties and nine advanced selections. The performances of these varieties were evaluated at three harvest dates, 99, 120, and 142 days after planting. Four replications of a randomized complete block design were harvested at each harvest date. Plots were 23 ft x 34 inches in size and the within row spacing was 12 inches. The trial was planted on April 30.

The previous crop was corn and a winter rye cover crop. Fertilizers used were 200 lbs/A 0-0-60 plowdown, 500 lbs/A 15-10-15-12S in the planter and a sidedressing of 100 lbs N as urea in four split applications with irrigation water. Aldicarb (Temik 15G) was applied at 20 lbs/A at planting. The hilling and herbicide application were all made just as the potatoes were emerging which was done on May 18. Immediately after hilling, a tank mix of Dual at 2 lbs/A plus Lexone at $\frac{1}{2}$ lb/A were applied for weed control and no further tillage was performed until harvest. The crop was irrigated 13 times, according to the MSU irrigation scheduling program. The minimum profile moisture content allowed was 50%. The amount of water applied ranged from 0.3 to 1.0 inch per application.

Results

The yield, size distribution and quality of the potato varieties at the three harvest dates are presented in Tables 1, 2 and 3. In general, 1986 was an exceptionally good year for potatoes. In spite of the heavy rainfall (13 inches) received between the second and third harvests, the specific gravity of the tubers remained high at the third harvest. With the exception of rainfall, weather conditions were generally favorable through the growing season.

The vigor, maturity and early blight data are presented in Table 4. The culinary quality of after cooking darkening recorded on November 10 is summarized in Table 5. Peeled halves of three tubers selected at random and cooked uniformly in steam were evaluated 0, 1 and 24 hours for darkening.

The chip color ratings after 120 days of storage at 50-55° F, as compared to those at harvest are presented in Table 6. Susceptibility to blackspot bruising was evaluated in artificially bruised and check treatments. Artificial bruising was done by placing potatoes inside a wooden drum and turning 10 revolutions at a moderate speed. In the check treatments, potatoes were tested without artificial bruising, so that any blackspot observed are only those incurred at the harvesting and handling operations. The results of blackspot evaluation are summarized in Table 7. The tendency to develop internal defects in oversized potatoes was determined by cutting 40 tubers of diameter $>3\frac{1}{4}$ inches from each variety at the 120- and 142-day harvests. The results of this study are presented in Table 8.

Among the early maturing varieties, Onaway produced the highest U.S. #1 yield and was free of internal defects. However, it had a low gravity, and a tendency to produce a higher percent of oversize tubers and growth cracks. Conestoga produced average yields but was highly susceptible to early blight.

Among the medium maturing varieties, MS 700-83, MS 704-10, MS 716-15, Atlantic and Krantz performed well. MS 700-83 produced good yields with a higher percent of U.S. #1 tubers. MS 704-10 is a golden flesh variety with a high specific gravity. MS 716-15 produced above average yields of excellent quality and high gravity. It had the best chip color among all varieties. Atlantic had the highest gravity but was susceptible to internal necrosis. Krantz produced acceptable yields but its gravity was lower than Russet Burbank. NorKing Russet had a poor marketable yield. In MS 702-91, tuber type was too variable and dry matter was insufficient for chips.

Among the late maturing varieties, MS 700-70 was a prolific yielder with the highest U.S. #1 yield at both 120- and 142-day harvests. A 76147-2 was another prolific yielder but with a slightly lower gravity than Russet Burbank. Acadia Russet produced above average yields with high gravity and good internal quality. Russet Burbank produced a poor marketable yield and an undesirably high percentage of undersize and knobby tubers.

In the culinary tests, undesirable levels of after cooking darkening occurred in MS 700-83, MS 700-79, ND 534-4, Onaway and Atlantic. In previous years, some of these varieties, particularly MS 700-83, had showed little or no after cooking darkening. Seasonal effects, such as heavy rainfall and fertilization, seem to have influenced this test. The chip color following 120 days of storage at 50-55° F was excellent in MS 716-15, MS 702-80, MS 702-91, Krantz and Atlantic. Acceptable chip color was found in MS 700-70, MS 704-10, MS 700-79, Conestoga and Sunrise.

The results of the bruising study indicated that in artificially bruised tubers, the varieties that were highly resistant to blackspot were ND 534-4 and NorKing Russet. Moderate levels of resistance were found in MS 702-80, MS 700-83, Onaway, Sunrise, A 76147-2, MS 702-91 and Conestoga. Krantz and Acadia Russet were found to be very susceptible. In the check treatments, most varieties showed no blackspot.

The varieties that exhibited the least amount of internal defects in oversized tubers were MS 716-15, ND 534-4, NorKing Russet, Krantz, Onaway and Russet Burbank. These varieties had less than 10% hollow heart and internal necrosis symptoms at the last two harvest dates.

Variety
Characteristics

- MS 700-79 - Round white, mid-season maturity with average yields and specific gravity. Has some scab resistance, but is susceptible to hollow heart. This seedling will be deleted from further tests.
- MS 700-83 - Round white, mid-season maturity and above average yields with medium gravity. Does chip out of field. In some years, after cooking darkening can be a problem. Possesses some scab resistance.
- MS 702-80 - Round white, mid-season maturity and average yields with medium gravity. Chips well and has good scab tolerance.
- MS 702-91 - Round white, mid-season maturity and high yield potential. Tuber shape tends to be variable and the gravity is too low for chipping. Has moderate scab resistance. This seedling will be deleted from further tests.
- MS 704-10 - Round tubers with yellow flesh. Mid-season maturity. Produces average yields with high specific gravity. Sets heavy and produces a golden color chip when processed from field and short term storage.
- MS 716-15 - Round white, medium-late maturity and above average yields with high gravity. Well shaped, smooth general appearance and has excellent chip color.
- MS 700-70 - Round white, late maturity and very high yields. Tubers have high gravity and good general appearance. Chip color is acceptable.
- A 76147-2 - Long, light russet, late maturity and very high yields with medium gravity. Good external appearance and minimal internal defects. Has potential for count pack market.

ND 534-4 - Oblong to long russet, early to mid-season maturity and produced below average yields. Tubers have very smooth external appearance with gravity lower than Russet Burbank. Good resistance to blackspot and minimal internal defects in 1986. Has potential for count pack market.

NorKing Russet - Oblong russet, medium-late maturity with very poor sizing in 1986. Yields below average with gravity higher than ND 534-4 but lower than Russet Burbank. Has good scab tolerance. Very smooth external appearance and minimal internal defects in 1986. Has potential for count pack market.

Acadia Russet - Long russet, late maturity and above average yields with high gravity. Fair general appearance, minimal internal defects in 1986. It is susceptible to scab and blackspot.

Krantz - Oblong russet, mid-late season maturity with average yields and gravity. Minimal internal defects in 1986.

Onaway - Round white, early maturity and above average yields with low gravity. Susceptible to early blight and growth cracks. Minimal internal defects.

Atlantic - Round white, mid-late season maturity and above average yields at all three harvest dates with high gravity. Has good chip color, however, hollow heart and internal necrosis is a problem. It is susceptible to scab.

Conestoga - Round-oblong white, early maturity with average yields and gravity. Produces an acceptable chip. Very susceptible to early blight.

Shepody - Long white, mid-late season maturity and average yields. Matures two to three weeks earlier than Russet Burbank but has similar gravity. Slow early establishment in the field. Sets fewer tubers than Russet Burbank but sizes quickly. Some susceptibility to scab but minimal internal defects in 1986. Good for french fry industry.

Sunrise - Round-oblong, early maturity with average yields and low gravity. Chip color is acceptable. Susceptible to growth cracks and scab.

Russet Burbank - Long russet, late maturity with very poor sizing and type. Below average yields but high gravity. Minimal internal defects in 1986.

UPPER PENINSULA
TRIAL

Sixteen potato varieties were tested in a randomized complete block design with four replications in the Upper Peninsula. The trial was planted on May 22 and harvested on September 29, 1986. The results of this trial are presented in Table 9.

The varieties MS 704-10, Acadia Russet, Onaway, A 76147-2 and MS 700-83 produced the highest U.S. #1 yields. The size distribution and dry matter content of most varieties in this trial were excellent.

NORTH CENTRAL
REGIONAL TRIAL

This trial is conducted in 14 states and provinces with entries from various breeding programs to obtain data from a wide range of adaptability prior to the release decision. Two MSU seedlings, MS 700-83 and MS 704-10 were included in the 1986 trial. Twenty varieties (ten round whites, six reds, four russets) were tested in a randomized complete block design with four replications. The results of this trial are presented in Tables 10 and 11.

The round whites that performed well in the trial were MS 700-83, W 832, MN 12161 and ND 651-9. W 879 had the highest gravity (1.090) but the tuber shape (very flattened) was unacceptable. The highest U.S. #1 yield was produced by W 848R, a red variety which also had a high specific gravity. Two russets that appeared promising were NE 165.75-2 and NEA 71.72-1, with high gravity and smooth tuber appearance. On a general merit rating based on appearance alone (disregarding maturity, yield and gravity), the five best varieties were ND 671-4 Russ, MN 12567, MS 704-10, NEA 71.72-1 and W 832. Chip color was excellent in MS 700-83 and ND 860-2, and was acceptable in MS 704-10, W 832, MN 12161 and MN 82328.

PRELIMINARY TRIAL

Six varieties reported to have good chipping characteristics were tested for yield and quality in a randomized complete block design with four replications. Plot size, fertilizer use and pest management were the same as for the dates-of-harvest study. The results are summarized in Table 12.

The U.S. #1 yields were high in F 72004, F 74123 and A 7411-2. Although F 72004 and F 7411-2 had sufficient dry matter for chipping, only F 7411-2 produced an acceptable chip color and warranted further testing. BR 7093-24 was late maturing and susceptible to hollow heart. ND 1538-1 and ND 651-9 had low U.S. #1 yields owing to poor sizing.

EIGHT-HILL
SELECTIONS FROM
NEW SEEDLING
INTRODUCTIONS

New seedling introductions, 16 from Michigan State University, 51 from North Dakota, 35 from New York and 65 from USDA-Aberdeen (Ore-Ida Foods, Inc.) were tested in 8-hill single plots. At harvest, 41 lines were selected on the basis of external appearance, size distribution and scab resistance in the field. These lines were further evaluated for dry matter, internal defects, chip color and after cooking darkening. Characteristics of the lines selected from MSU, North Dakota and New York are presented in Tables 13, 14 and 15, respectively. Those seedlings that meet the industry requirements for fresh market, chip and frozen processing will be further tested in 1987 in larger plots.

VARIETY EVALUATIONS
FOR SCAB

Potato scab continues to be of concern with several of the newer varieties. Each year Dr. Ray Hammerschmidt conducts evaluations of varieties and advanced seedlings to assess their tolerance or susceptibility to scab. Locations are selected on cooperators farms where scab is known to have been a problem. Table 16 classes the several varieties evaluated for their reactions to scab in 1986.

Michigan Table 1. First date of harvest yield data (99 days). Harvested August 7, 1986.

Variety	Yield cwt/A ^{1/}		% Size Distribution					Specific Gravity	Chip ^{3/} Score	Internal Defects ^{2/}		
	U.S. #1	Total	U.S. #1	<2	2-3 $\frac{1}{4}$	>3 $\frac{1}{4}$	Pick Outs			HH	Vas. Dis.	Int. Necrosis
A 76147-2	397	489	81	16	67	14	3	1.069	2.5	0	0	0
MS 700-83	392	446	88	10	85	3	2	1.073	1.5	0	0	2
Onaway	386	477	81	10	71	10	9	1.068	3.0	0	0	0
MS 702-91	365	433	84	9	75	9	7	1.071	1.5	0	0	2
Atlantic	346	406	85	13	79	6	2	1.081	1.5	0	0	0
MS 700-70	335	425	79	18	78	1	3	1.079	1.5	0	1	4
MS 716-15	333	392	85	14	78	7	1	1.079	1.0	0	0	1
MS 704-10	327	423	77	22	75	2	1	1.077	1.5	0	0	1
Conestoga	327	385	85	13	76	9	2	1.076	1.5	0	0	0
Sunrise	320	395	81	13	73	8	6	1.071	1.5	0	0	0
Krantz	296	389	76	17	68	8	7	1.069	2.0	0	0	0
MS 702-80	295	347	85	15	82	3	0	1.072	1.5	0	0	4
ND 534-4	278	383	72	23	64	8	5	1.069	2.0	0	0	0
Shepody	274	356	77	20	67	10	3	1.078	2.0	0	0	0
MS 700-79	254	315	81	16	77	4	3	1.073	1.5	0	0	1
Acadia Russet	218	381	57	41	56	1	2	1.076	2.5	0	0	0
NorKing Russet	189	327	58	40	57	1	2	1.078	2.0	0	0	0
Russet Burbank	181	361	50	45	50	0	5	1.078	2.0	0	0	4
Average	306	396						1.074				

1/ BLSD for U.S. #1 = 51 cwt/A. CV = 8.8%.

2/ 20 tubers cut to determine internal defects.

3/ PC/SFA 1-5 scale, 1 = lightest; 5 = darkest.

Michigan Table 2. Second date of harvest yield data (120 days). Harvested August 28, 1986.

Variety	Yield cwt/A ^{1/}		% Size Distribution				Specific Gravity	Chip ^{3/} Score	Internal Defects ^{2/}		
	U.S. #1	Total	U.S. #1	<2	2-3 $\frac{1}{4}$	>3 $\frac{1}{4}$			HH	Vas. Dis.	Int. Necrosis
MS 700-70	550	618	89	7	65	24	1.088	1.5	0	2	2
A 76147-2	543	664	82	12	49	33	1.076	2.5	0	0	1
Atlantic	460	510	90	8	67	23	1.088	1.5	0	0	1
MS 700-83	445	503	88	9	67	21	1.074	1.5	0	0	2
Onaway	432	550	79	11	63	16	1.066	3.5	0	0	0
Shepody	401	523	77	12	51	26	1.086	1.5	0	2	0
MS 716-15	396	458	86	10	62	24	1.085	1.0	0	0	0
MS 702-91	383	453	85	8	67	18	1.072	1.5	0	2	4
MS 704-10	381	487	78	18	64	14	1.082	1.5	0	2	0
Acadia Russet	374	534	70	24	61	9	1.086	3.5	1	0	2
Krantz	355	457	78	13	56	22	1.071	2.0	0	5	2
MS 702-80	345	420	82	10	64	18	1.073	1.5	0	0	0
Conestoga	332	397	83	12	73	10	1.071	1.5	0	0	1
Sunrise	319	418	76	15	58	18	1.067	1.5	0	0	0
ND 534-4	300	411	74	20	49	25	1.070	2.5	0	0	1
MS 700-79	287	347	83	13	75	8	1.076	2.0	2	1	0
Russet Burbank	233	458	52	31	49	3	1.086	2.0	0	0	3
NorKing Russet	187	357	53	43	47	6	1.082	2.0	0	2	1
Average	374	476					1.078				

^{1/} BLSD for U.S. #1 = 71 cwt/A. CV = 13.6%.^{2/} 20 tubers cut to determine internal defects.^{3/} PC/SFA 1-5 scale, 1 = lightest; 5 = darkest.

Michigan Table 3. Third date of harvest yield data (142 days). Harvested September 22, 1986.

Variety	Yield cwt/A ^{1/}		% Size Distribution					Specific Gravity	Chip ^{3/} Score	Internal Defects ^{2/}		
	U.S. #1	Total	U.S. #1	<2	2-3 ^{1/4}	>3 ^{1/4}	Pick Outs			HH	Vas. Dis.	Int. Necrosis
MS 700-70	620	676	92	6	66	26	2	1.084	2.0	0	2 s1	5
A 76147-2	611	747	82	12	51	31	6	1.077	3.0	0	1 s1	4
Atlantic	521	569	91	6	65	26	3	1.090	1.5	0	1 s1	6
Acadia Russet	504	663	76	20	65	11	4	1.086	4.5	0	4 s1	0
MS 716-15	488	545	89	7	64	25	4	1.086	1.5	1	1 s1	0
MS 702-91	488	534	91	7	67	24	2	1.073	1.5	0	1 s1	0
MS 700-83	468	522	89	9	63	26	2	1.074	2.0	0	2 s1	0
Onaway	445	547	81	6	66	15	9	1.072	4.0	0	2 s1	1
Shepody	430	558	77	14	54	23	9	1.083	2.0	0	2 s1	1
MS 702-80	428	473	90	8	69	21	2	1.076	1.5	0	0	3
MS 704-10	394	499	79	17	69	10	4	1.080	1.5	0	2	1
ND 534-4	372	485	76	17	51	26	6	1.073	3.0	0	1 s1	0
Krantz	363	468	78	14	61	17	8	1.075	2.0	0	3 s1	0
Sunrise	354	429	82	10	66	16	8	1.072	1.5	0	0	1
Russet Burbank	347	567	61	25	51	10	14	1.086	2.5	0	3 s1	0
Conestoga	341	400	85	12	69	16	3	1.076	1.5	0	3 s1	0
MS 700-79	311	376	83	14	69	14	3	1.077	2.0	3	1 s1	2
NorKing Russet	250	395	63	35	60	3	2	1.078	2.0	0	0	1
Average	430	525						1.079				

^{1/} BLSD for U.S. #1 = 83 cwt/A. CV = 13.8%.^{2/} 20 tubers cut to determine internal defects.^{3/} PC/SFA 1-5 scale, 1 = lightest; 5 = darkest.

Michigan Table 4. The vigor, maturity and early blight ratings of potato varieties in the dates of harvest trial.

Variety	Vigor ^{1/}	Maturity ^{2/}	Early Blight ^{3/}
MS 700-79	3.8	3.0	1.0
MS 700-83	4.5	2.8	1.1
MS 702-80	3.7	3.5	1.0
MS 702-91	3.8	2.8	1.3
MS 704-10(Y)	4.3	2.8	1.2
MS 716-15	4.5	3.7	1.0
MS 700-70	5.0	4.0	1.0
A 76147-2	4.4	4.0	1.0
ND 534-4	3.8	2.2	1.7
NorKing Russet	4.3	2.5	1.3
Acadia Russet	4.7	4.2	1.0
Krantz	4.7	3.1	1.4
Onaway	4.9	2.0	2.1
Atlantic	5.0	3.8	1.0
Conestoga	4.3	1.0	3.3
Shepody	4.6	4.0	1.1
Sunrise	4.1	2.0	1.4
Russet Burbank	4.3	4.5	1.0

^{1/} Vigor: When tops have reached maximum size, before visible signs of maturity. Taken 68 days after planting. Scale of 1-5, 1 = poor; 5 = excellent.

^{2/} Maturity: When tops show differences in maturity. Taken 93 days after planting. Scale of 1-5, 1 = early; 5 = very late.

^{3/} Early Blight Rating: Scale of 1-5, 1 = resistant; 5 = highly susceptible.

Michigan Table 5. After-cooking-darkening^{1/} of potato varieties grown in the 1986 dates-of-harvest trial.

Variety	0 Hours	1 Hour	24 Hours	Comments
MS 700-79	1.5	2.5	2.5	All three tubers darkened
MS 700-83	2.0	3.0	3.5	All three tubers darkened
MS 702-80	1.5	1.5	1.5	One with dark end
MS 702-91	1.0	1.5	1.5	One with dark end
MS 704-10	1.0	1.0	1.0	
MS 716-15	1.0	1.5	1.5	Some sloughing
MS 700-70	1.0	1.5	1.5	
A 76147-2	1.0	1.5	2.0	
ND 534-4	1.0	2.0	2.0	Dark color overall
NorKing Russet	1.0	1.0	1.0	
Acadia Russet	1.0	1.5	1.5	Dark color overall
Krantz	1.0	1.0	1.0	
Onaway	1.0	1.0	1.0	
Atlantic	1.5	2.0	2.0	Two dark stem ends
Conestoga	1.5	1.5	1.5	Two dark stem ends
Shepody	1.0	1.0	1.0	
Sunrise	1.5	1.5	2.0	Three dark ends
Russet Burbank	1.0	1.0	1.0	

^{1/} Tubers stored at 50-55° F since harvest. Rating scale 1-5, 1 = no darkening; 5 = severe darkening (black) overall.

Michigan Table 6. The chip color of potato varieties at harvest and after 120 days of storage at 55° F.

Variety	Chip Score ^{1/}	
	At Harvest	120 Days
MS 700-79	2.0	1.5
MS 700-83	1.5	2.0
MS 702-80	1.5	1.0
MS 702-91	1.5	1.0
MS 704-10	1.5	1.5
MS 716-15	1.0	1.0
MS 700-70	1.5	1.5
A 76147-2	2.5	2.5
ND 534-4	2.5	3.5
NorKing Russet	2.0	2.0
Acadia Russet	3.5	3.5
Krantz	2.0	1.0
Onaway	3.5	3.5
Atlantic	1.5	1.0
Conestoga	1.5	1.5
Shepody	1.5	2.0
Sunrise	1.5	1.5
Russet Burbank	2.0	2.0

^{1/} Chip Score: PC/SFA scale 1-5, 1 = lightest; 5 = darkest.

Michigan Table 7. Blackspot susceptibility of potato varieties in the dates-of-harvest trial^{1/}.

Variety	Artificially Bruised		Check	
	% Tubers with Blackspot	Severity ^{2/} Index	% Tubers with Blackspot	Severity ^{2/} Index
MS 702-91	20	0.2	0	0
MS 700-79	30	0.4	0	0
MS 716-15	30	0.5	0	0
MS 702-80	20	0.2	0	0
MS 704-10	40	0.4	10	0.1
MS 700-83	20	0.2	0	0
NorKing Russet	10	0.1	0	0
Krantz	40	0.4	0	0
Russet Burbank	30	0.6	0	0
Acadia Russet	80	2.5	10	0.1
Onaway	20	0.2	10	0.2
Shepody	30	0.3	0	0
Sunrise	20	0.2	0	0
A 76147-2	20	0.2	10	0.1
Conestoga	20	0.3	0	0
ND 534-4	0	0.0	0	0
Atlantic	30	0.6	0	0

^{1/} Potatoes were stored at 40° F for 120 days following harvest. The bruised tubers and the check treatments were placed at 55° F for one week before peeling.

^{2/} Severity Index: Number of blackspot bruises per tuber.

Michigan Table 8. Internal defects in oversized tubers at two dates of harvest.

Variety	% Tubers			
	Hollow Heart		Internal Necrosis	
	120 Days	142 Days	120 Days	142 Days
MS 700-79	12	28	4	12
MS 700-83	10	10	5	10
MS 702-80	6	4	3	14
MS 702-91	5	5	20	16
MS 704-10	13	22	3	8
MS 716-15	5	8	0	2
MS 700-70	10	5	10	12
A 76147-2	5	10	0	2
ND 534-4	3	5	6	5
NorKing Russet	4	3	0	0
Acadia Russet	10	8	4	0
Krantz	0	0	0	0
Onaway	0	0	3	0
Atlantic	16	13	10	12
Conestoga	3	16	13	5
Shepody	3	10	0	2
Sunrise	12	11	3	2
Russet Burbank	0	6	0	0

Michigan Table 9. Tuber yield, size distribution and specific gravity of potato varieties in the Upper Peninsula.

Variety	Yield cwt/A		% Size Distribution					Specific Gravity
	U.S. #1	Total	U.S. #1	<2	2-3¼	>3¼	Pick Outs	
MS 704-10	352	369	95	4	52	44	0	1.087
Acadia Russet	336	382	88	6	53	35	5	1.081
Onaway	317	328	97	3	30	66	0	1.079
A 76147-2	303	326	93	3	32	61	4	1.072
MS 700-83	302	323	93	4	50	43	3	1.081
Russet Burbank	270	325	83	8	54	29	9	1.080
Krantz	267	288	93	4	54	39	3	1.081
ND 534-4	266	288	92	5	53	40	3	1.079
MS 702-80	259	274	94	5	50	45	1	1.082
Atlantic	250	272	92	7	52	39	1	1.090
MS 716-15	243	253	96	4	50	46	0	1.088
MS 702-91	243	266	92	3	60	32	5	1.082
MS 700-70	230	246	93	7	47	46	0	1.081
NorKing Russet	213	230	92	5	62	30	3	1.080
Conestoga	187	190	99	1	78	21	0	1.081
Nooksack	<u>163</u>	<u>175</u>	93	5	69	24	2	<u>1.084</u>
Average	263	283						1.082

Michigan Table 10. Yield, solids, maturity and chip quality of potato varieties in the North Central Regional Trial.

Selection Number or Variety	Aver. Mat.	Most Representative Area-Type	CWT/A Aver. Yield US #1	CWT/A Aver. Percent US #1	(Not Solids/a) Aver. Total Solids	Gen. Merit Rating	Chip Color	Early Blight Reading	Comments and General Notes
EARLY									
Norland	1.0	0	376	315	84	16.5	2.5	3.0	
ND 651-9	2.0	0	493	383	77	18.6	2.5	3.0	
ND 860-2	1.0	0	339	259	76	18.8	1.0	3.0	
W 832	3.0	0	459	405	89	19.9	1.5	4.0	High % oversize tubers.
MEDIUM TO LATE									
MS 700-83	3.0	1 - 1	541	468	87	19.0	1.0	3.7	Nice tuber appearance.
MS 704-10	3.0	0	471	311	66	20.1	1.5	3.7	Flesh br. yellow, high % <2".
MN 12161	3.5	0	485	361	75	19.9	1.5	4.0	
MN 12567	3.8	0	506	388	77	18.6	2.5	4.0	
MN 82328	3.5	0	427	297	70	19.2	1.5	4.0	Sprouts early.
NE 165.75-2	4.5	0	453	390	86	19.4	2.5	5.0	High % oversize tubers.
NEA 71.72-1	3.5	0	448	361	81	19.4	2.5	4.5	Nice smooth tubers.
BN 9803-1	3.0	0	410	316	77	20.5	2.0	4.0	Rough, irregular shape, knobs.
ND 671-4Russ	2.8	0	490	311	63	18.4	2.5	3.7	High % of tubers <4 oz.
NDT 9-1068-11R	3.2	0	593	504	85	16.9	3.5	3.5	Prominent growth cracks.
W 879	3.0	0	445	377	85	21.8	2.0	3.7	Flat tubers, irregular shape.
W 948R	3.0	0	655	557	85	19.9	2.5	4.0	
Red Pontiac	3.5	1 - 2	473	388	82	17.5	3.5	4.2	
Russet Burbank	4.5	0	613	283	46	21.2	3.0	4.2	High % of tubers <4 oz.
Norgold Russet	3.0	0	347	197	57	18.2	4.0	3.7	High % of tubers <4 oz.
Norchip	3.0	0	441	356	80	19.9	2.0	3.5	

1/ 1-Very Early-Norland maturity; 2-Early-Irish Cobbler maturity; 3-Medium-Red Pontiac maturity;

4-Late-Katahdin maturity; 5-Very Late-Kennebec or Russet Burbank maturity.

2/ AREA - T-less than 1%; 1 - 10-20%; 2 - 21-40%; 3 - 41-60%; 4 - 61-80; 5 - 81-100%. TYPE - 1. Small, superficial; 2. Larger, superficial; 3. Larger, rough pustules; 4. Larger pustules, shallow holes; 5. Very large pustules, deep holes.

3/ Place top five among all entries including check varieties; disregard maturity classification. (Rate first, second, third, fourth and fifth (in order) for overall worth as a variety).

4/ Chip Color - SFA Score 1 = lightest, 5 = darkest.

5/ Early Blight - 1 - susceptible; 5 - highly resistant.

Michigan Table 11. Summary of external and internal grade defects of North Central Regional Trial.

Selection Number or Variety	External Defects ^{1/}			Total ^{2/} Tubers Free of External Defects	Internal Defects ^{1/}			Normal ^{4/} Tubers	Percent Pick Outs ^{5/}
	Scab ^{3/}	Growth Cracks	Second Growth		Hollow Heart	Internal Necrosis	Vascular Discoloration		
EARLY									
Norland	0	0	0	100	2	2	4 s1	92	1
ND 651-9	0	8	0	92	0	0	24 s1	76	2
ND 860-2	0	2	0	98	0	4	2 s, 6 s1	88	1
W 832	0	0	0	100	4	0	4 s, 2 s1	90	4
MEDIUM TO LATE									
MS 700-83	2	2	0	96	4	14	6 s1	76	1
MS 704-10	0	4	0	96	0	6	2 s, 6 s1	86	3
MN 12161	0	0	0	100	0	0	0	100	2
MN 12567	0	2	0	98	0	2	36 s1	62	1
MN 82328	0	0	0	100	0	2	4 s1	94	2
NE 165.75-2	0	0	4	96	2	4	4 s, 6 s1	84	6
NEA 71.72-1	0	0	0	100	10	4	6 s1	80	1
BN 9803-1	0	2	8	90	24	2	2 s1	72	8
ND 671-4Russ	0	0	0	100	0	0	2 s1	98	3
NDT 9-1068-11R	0	6	4	90	2	0	4 s, 6 s1	88	7
W 879	0	0	0	100	0	0	6 s1	94	4
W 948R	0	0	0	100	0	2	20 s1	78	1
Red Pontiac	2	4	0	94	14	0	12 s1	74	5
Russet Burbank	0	2	14	84	0	4	4 s1	92	22
Norgold Russet	0	2	2	96	2	2	0	96	8
Norchip	0	2	6	92	0	0	6 s1	94	5

^{1/} Based on four 25 tuber samples (one from each replication). Percentage based on number of tubers.

^{2/} This total - tubers free from any external defect of any sort.

^{3/} Includes all tubers with scab lesions whether merely surface, pitted or otherwise and regardless of area.

^{4/} Percentage normal tubers are those showing no internal defects. Some individual tubers will have more than one type of internal defects.

^{5/} Percent pick-outs (knobs, growth crack) determined at time of field grading and percentage of total weight. Pick outs are discarded so are not included in sample when external and internal defects are determined.

Michigan Table 12. Yield, size distribution and quality of potato varieties tested in the preliminary trial.

Variety	Yield cwt/A		% Size Distribution				Specific Gravity	Chip ^{3/} Score	Maturity ^{4/}	Early ^{5/} Blight	Internal Defects ^{1/}		
	U.S. #1	Total	U.S. #1	<2	2-3 $\frac{1}{4}$	Pick Outs >3 $\frac{1}{4}$					HH	Vas. Dis.	Int. Necrosis
F 72004	523	564	93	5	67	26	2	2.5	3.1	2.0	0	2	1
F 74123	462	554	83	11	68	15	6	2.5	2.5	1.8	3	0	3
A 7411-2	442	515	86	10	59	27	4	1.5	3.8	2.2	3	0	2
BR 7093-24	363	436	83	13	67	16	4	2.0	4.6	1.2	8	0	2
ND 1538-1	330	455	73	25	66	7	2	2.5	2.2	2.0	1	0	0
ND 651-9	260	428	61	39	61	0	0	1.5	2.9	2.0	0	2	2
Average	397	492							1.079				

^{1/} 20 tubers cut to determine internal defects.^{2/} LSD for U.S. #1 = 57 cwt/A. CV = 9.5%.^{3/} PC/SFA scale 1-5, 1 = lightest; 5 = darkest.^{4/} Maturity: 1 = early, 5 = very late maturity.^{5/} Early Blight: 1 = resistant, 5 = susceptible to early blight.

Michigan Table 13. Characteristics of MSU seedlings selected from eight-hill plots.

Variety	Yield (lbs)		% Size Distribution					Specific Gravity	Mat ^{1/}	EB ^{2/}	Internal Defects			Chip ^{3/} Color	ACD ^{4/}
	No. 1	Total	#1	<2	2-3 $\frac{1}{2}$	>3 $\frac{1}{2}$	Pick Outs				HH	IN	VD		
MS 401-5	27.5	29.5	93	7	83	10	0	1.090	5.0	2	9	2	0	1.5	1.0
MS 401-2	26.5	27.5	96	4	93	3	0	1.090	4.0	2	0	0	0	1.5	1.0
MS 401-3	23.0	25.3	91	8	85	6	1	1.086	3.0	2	0	8	0	2.0	2.0
MS 402-7	23.0	26.0	88	12	73	15	0	1.078	2.5	2	0	2	1 sl	3.5	1.5
MS 401-7	22.7	28.0	81	18	78	3	1	1.091	3.5	1	1	6	1 sl	2.5	1.0
MS 402-3	21.7	23.2	94	6	91	3	0	1.082	?	?	0	4	1 sl	3.0	1.5
MS 402-1	21.0	23.0	92	4	59	33	4	1.079	3.0	2	1	2	0	3.0	1.5
MS 402-6	20.0	22.5	89	2	89	0	9	1.076	2.0	2	0	6	1 sl	2.5	1.0
MS 401-6	17.5	18.2	96	4	63	33	0	1.086	3.0	1	1	8	0	2.0	1.5
MS 401-8	16.0	17.8	90	8	70	20	2	1.086	2.5	2	0	3	0	1.5	1.0
MS 402-5	16.0	19.0	84	16	76	8	0	1.078	2.0	2	0	18	1 sl	4.0	1.0
MS 402-8	15.0	16.0	94	6	72	22	0	1.076	2.0	2	0	2	2 sl	2.5	1.5
MS 401-1	15.0	21.0	71	29	71	0	0	1.086	2.0	2	0	4	0	1.0	1.5
MS 402-2	14.0	16.5	85	15	85	0	0	1.077	2.0	1	3	3	0	2.5	1.5
MS 402-4	12.5	18.0	69	28	69	0	3	1.074	1.5	1	0	1	1 sl	2.5	1.0
Russet Burbank	10.5	16.2	65	34	65	0	1	1.088	5.0	1	0	0	1 sl	3.0	1.0
MS 401-4	8.0	13.5	59	41	59	0	0	1.082	1.5	1	1	1	1 sl	2.0	1.0

^{1/} Maturity: 1 = early, 5 = very late maturity.^{2/} Early Blight: 1 = resistant, 5 = highly susceptible.^{3/} PC/SFA 1-5 scale: 1 = lightest, 5 = darkest.^{4/} After cooking darkening score after 1 hour: 1 = no darkening, 5 = very dark.

Michigan Table 14. Characteristics of North Dakota seedlings selected from eight-hill plots.

Variety	Yield (lbs)		% Size Distribution					Specific Gravity	Mat ^{1/} EB ^{2/}	Internal Defects			Chip ^{3/} Color	ACD ^{4/}
	No. 1	Total	#1	<2	2-3 $\frac{1}{4}$	>3 $\frac{1}{4}$	Pick Outs			HH	IN	VD		
ND 1719-5	27.0	28.5	95	5	84	11	0	1.079	2.0	0	0	1 s1	3.5	1.0
ND 1725-13	26.5	34.0	78	21	69	9	1	1.082	2.5	1	1	1 s1	1.0	1.5
ND 2233-2	25.0	26.0	96	4	85	11	0	1.081	3.5	0	1	2 s1	3.0	1.0
ND 2112-2	24.0	25.8	93	6	76	17	1	1.078	1.5	0	0	1 s1	1.5	2.0
ND 2126-11	21.5	25.0	86	14	80	6	0	1.081	1.5	0	1	1 s1	2.0	1.0
ND 1859-3	21.0	23.5	89	11	89	0	0	1.087	3.0	0	2	1 s1	3.0	1.0
ND 2135-3-R	20.0	27.0	74	19	74	0	7	1.076	2.0	1	0	0	3.5	1.5
ND 2179-10	20.0	23.0	87	13	74	13	0	1.084	2.0	0	1	1 s1	3.5	1.5
Atlantic	19.0	24.5	78	22	78	0	0	1.094	3.5	0	1	1 s1	1.5	1.0
ND 862-8	18.5	23.0	80	20	80	0	0	1.068	1.5	0	2	1 s1	2.0	1.0
ND 2126-7	17.7	26.7	66	34	64	2	0	1.077	3.0	0	3	1 s1	1.5	1.0
ND 2109-7	17.0	23.5	72	28	60	12	0	1.083	2.5	0	0	1 s1	1.0	2.0
ND 1215-1	15.2	20.7	73	27	67	6	0	1.076	3.5	0	1	1 s1	2.0	1.0
ND 2212-9	12.7	17.7	72	11	48	24	17	1.072	2.0	1	0	0	3.5	1.5
ND 1850-5	11.0	15.0	73	27	60	13	0	1.073	1.5	0	0	2 s1	3.0	1.0

1/ Maturity: 1 = early, 5 = very late maturity.2/ Early Blight: 1 = resistant, 5 = highly susceptible.3/ PC/SFA 1-5 scale: 1 = lightest, 5 = darkest.4/ After cooking darkening score after 1 hour: 1 = no darkening, 5 = very dark.

Michigan Table 15. Characteristics of New York seedlings selected from eight-hill plots.

Variety	Yield (lbs)		% Size Distribution					Specific Gravity	Mat ^{1/}	EB ^{2/}	Internal Defects			Chip ^{3/} Color	ACD ^{4/}
	No. 1	Total	#1	<2	2-3 $\frac{1}{4}$	>3 $\frac{1}{4}$	Pick Outs				HH	IN	VD		
NY 191-2	38.0	42.0	90	10	83	7	0	1.065	3.5	2	0	1	1	3.5	1.0
NY 123-4	34.0	36.0	94	3	72	22	3	1.071	2.5	2	2	0	1	3.0	1.0
NY 191-1	27.6	33.6	82	18	73	9	0	1.079	4.0	1	0	0	0	3.5	1.0
NY 85-10	25.5	30.5	84	16	77	7	0	1.075	5.0	1	0	1	1 s1	3.0	1.0
NY 130-4	25.5	30.0	85	13	72	13	2	1.082	3.0	1	0	5	0	1.0	1.0
NY 130-5	25.5	26.0	98	2	83	15	0	1.085	5.0	2	2	3	1 s1	2.0	1.5
NY 140-2	25.2	29.7	85	13	71	14	2	1.075	2.0	2	3	0	1 s1	2.5	1.0
NY 195-11	21.2	24.0	88	12	76	12	0	1.088	3.0	2	2	1	0	1.0	1.0
NY 143-9	20.5	28.2	73	26	73	0	1	1.084	3.0	2	0	1	1 s1	4.0	1.0
NY 125-6	19.5	23.5	83	17	74	9	0	1.090	3.0	3	0	3	0	1.5	1.5
NY 164-9	19.0	21.7	87	12	78	9	1	1.092	2.5	2	2	3	0	1.5	1.5
NY 195-3	18.2	23.2	79	17	76	3	0	1.089	2.5	2	0	2	1 s1	1.5	1.0
Russet Burbank	10.0	16.0	63	25	63	0	12	1.090	5.0	1	1	0	1	3.0	1.0

1/ Maturity: 1 = early, 5 = very late maturity.2/ Early Blight: 1 = resistant, 5 = highly susceptible.3/ PC/SFA 1-5 scale: 1 = lightest, 5 = darkest.4/ After cooking darkening score after 1 hour: 1 = no darkening, 5 = very dark.

Michigan Table 16. Variety reactions to scab.

Resistant	Intermediate	Susceptible
Alasclear	Islander	Acadia Russet
Krantz	Nooksack	Atlantic
NorKing Russet	MS 700-83	Chipbelle
Onaway	MS 702-91	Conestoga
Ontario		Crystal
Pungo		Denali
Rideau		Jemseg
Russet Burbank		Katahdin
Superior		Monona
MS 700-79		Oceania
MS 702-80		Rosa
MS 714-10		Sebago
		Shepody
		Simcoe
		Snowchip
		Yukon Gold
		Yankee Chipper
		Yankee Supreme
		MS 700-70
		MS 701-22
		MS 704-10(Y)
		MS 716-15
		MS 718-16

UNIVERSITY OF MINNESOTA
MINNESOTA POTATO BREEDING PROGRAM

Florian Lauer (Professor), Richard Wenkel, Dave Wildung, John Wiersma, Neil Anderson, Ernest Banttari, Duane Preston, Glen Titrud, Brian Smith, and Frank Treadwell

Yield trials of advanced selections and new named varieties were conducted in the RRV at Grand Forks and Baker (Preston), on nonirrigated sandy loam soil at Grand Rapids (Wildung), on irrigated sandy soil at Becker (Titrud) and Big Lake (Ertel). They were planted in 20 hill plots and replicated twice.

New varieties and advanced selections from other breeding programs included Langlade (Wisconsin), Norking and ND534-4 (North Dakota), Elba (New York), and WC567-1 (Colorado). Of these, Langlade was the highest yielder (Table 1) but it also had a high incidence of hollow heart.

Of the MN numbered selections, 10874, a russett, has consistently given good performance. Substantial seed lots are being developed by seed growers. Production growers interested in new russets should acquaint themselves with 10874. If satisfactory performance continues, we will probably name it in 1988.

MINNESOTA TABLE 1. REPLICATED YIELD TRIALS - 1986

Grand Forks, Becker late, and Baker

Variety	Color	Vigor ¹	Mat. ²	Early ³ blight	Type	Total ⁴ yield	Market. ^{4,5} yield	Specific ⁶ gravity	Shape ⁷	Hollow ⁸ heart	Scab res.	1985 Gf ⁹ chipping 43F 65F
REDDALE	red	1.2	5.0	6.5	2.3	65.6	62.7	1.071	2.0	01000010	res	15 20
PONTIAC	red	1.0	4.8	5.5	3.0	60.1	57.0	1.070	2.0	60000013	sus	17 18
13035	dark red	1.2	4.0	8.5	2.0	57.0	53.2	1.073	2.3	00000000	res	18 30
*LANGLADE	white	1.2	5.0	4.5	2.3	53.9	52.0	1.080	1.0	46603021	-	22 30
KENNEBEC	white	1.0	4.3	5.0	3.3	54.5	51.4	1.075	2.5	00000012	sus	18 22
12567	white	1.3	3.5	7.0	2.3	53.3	50.5	1.080	2.5	00000011	res	23 35
12823	white	1.3	4.5	6.5	2.0	50.9	48.0	1.078	1.8	00001000	int	37 43
*12465	white	1.5	4.0	8.0	2.0	48.3	46.0	1.073	1.8	02010000	res	22 29
13056	white	1.0	4.0	5.5	1.5	49.0	44.6	1.082	2.3	11000000	res	30 35
13054	white	1.2	2.5	8.5	2.0	47.9	44.6	1.078	2.0	01000000	res	27 31
NORKING	russet	1.3	3.8	9.0	1.5	48.2	44.3	1.080	2.3	43010045	-	-
*TOLAAS	white	1.8	2.5	8.0	2.5	46.0	43.4	1.077	3.0	00000000	res	17 18
12966	dark red	1.3	3.0	7.0	2.0	45.4	42.6	1.083	2.0	00000000	res	31 37
NORCHIP	white	1.8	3.0	7.5	2.8	44.9	42.1	1.087	1.0	00000100	res	36 36
NORLAND	red	1.5	1.5	9.0	1.8	43.5	41.2	1.073	1.8	100000--	res	24 32
10874	russet	1.5	3.8	4.5	1.3	43.3	40.6	1.081	2.3	40100030	int	16 20
13079	white	1.5	2.5	9.0	2.3	42.1	39.9	1.084	3.0	00000000	int	28 36
12820	white	1.5	1.0	7.0	2.0	44.1	39.9	1.082	1.8	000000--	res	43 46
SHEPODY	white	1.3	4.5	5.5	3.3	43.4	39.6	1.085	3.0	0110--30	sus	15 20
ND534-4	russet	1.3	3.3	8.0	2.3	43.2	39.5	1.077	2.8	52000040	-	-
*12764	white	1.5	2.5	7.0	2.8	44.6	38.4	1.075	1.0	00000000	res	32 42
11705	white	1.7	1.3	9.0	1.8	42.0	38.1	1.078	2.0	00000000	res	36 44
*12161	white	1.0	4.0	6.5	2.8	48.2	38.1	1.086	2.5	00000040	res	15 33
12828	pink eye	1.7	1.5	9.0	1.5	40.7	38.1	1.087	2.0	000011--	res	41 39
*12972	light red	1.3	2.0	9.0	2.0	45.1	37.9	1.073	1.0	00000010	res	23 31

cont. on next page

MINNESOTA TABLE 1. REPLICATED YIELD TRIAL - 1986

Grand Forks, Becker late, and Baker

(Cont.)

Variety	Color	Vigor ¹	Mat. ²	Early ³ blight	Type	Total ⁴ yield	Market. ^{4,5} yield	Specific ⁶ gravity	Shape ⁷	Hollow ⁸ heart	Scab res.	1985 GF ⁹ chipping 43F 65F
*13019	pink eye	1.0	4.0	6.0	2.8	43.6	37.1	1.085	2.0	00000000	res	20 27
*12805	white	1.5	2.0	6.5	2.3	41.7	36.8	1.078	2.0	00000000	res	33 34
*82328	light red	1.8	2.5	7.5	1.8	40.2	36.8	1.080	2.0	00000010	res	29 28
KRANTZ	russet	1.5	4.3	8.0	1.8	38.9	36.6	1.081	2.0	00000121	res	24 29
12331	russet	2.2	3.3	6.5	2.0	37.9	33.9	1.080	1.3	00000010	res	36 42
BURBANK	russet	1.7	5.5	4.0	3.3	34.9	30.4	1.083	3.0	24410012	res	27 22
NORGOLD	russet	1.8	2.5	9.0	1.8	32.2	27.6	1.075	2.3	141120--	res	14 19

New Jersey
M R Henninger
Rutgers University, New Brunswick, NJ

Introduction: Trials were conducted at three locations: Rutgers Research & Development Center near Bridgeton, Rutgers Vegetable Research Farm near New Brunswick and at the Soils and Crops Research Farm in Adelphia.

Methods:

Bridgeton - Single row plots 21' long, 3' apart, and 9" between seed pieces were planted on April 2 using a randomized complete block design. The fertilization was as recommended by soil test with 100 - 100 - 300 lbs/a of N P₂O₅ K₂O broadcast and disk-in before planting. An additional 50 lbs/a of N was top-dressed when the plants were 2 to 4" tall. Pests were controlled and not a limiting factor. Irrigation was applied as needed. This location was in sod for the past 15 years. The vines were mechanically removed and the plots were dug on August 4 after 124 days of growth.

New Brunswick - Single row plots 21' long, 3' apart, and 9" between seed pieces were planted on April 14 using a randomized complete block design. The fertilization was as recommended by soil test with 100 - 100 - 100 lbs/a of N P₂O₅ K₂O broadcast and disk-in before planting. An additional 50 lbs/a of N was top-dressed when the plants were 2 to 4" tall. Pests were controlled and not a limiting factor. Irrigation was applied as needed. The plots were vine killed on September 3 and harvested on September 8 after 142 days of growth.

Adelphia - Double row plots 12' long, 3' apart, and 9" between seed species with 4 replications were planted April 11 using a randomized complete block design. Fertilization was banded at planting 2000 lbs/a of 10-10-10. Pests were controlled with limited Colorado Potato Beetle defoliation in August. Irrigation was applied as needed. This location was not in potatoes for 10 years but has been cropped. The plots were vine killed on September 3 and harvested on September 16 after 145 days of growth.

All locations were graded and sized immediately after harvest. Culls were removed and weighed before sizing. The russets were hand sized by weight. Specific gravity was determined using the weight in air and water method.

New Jersey Table 1. Total and Marketable Yield, Specific Gravity, Percent of Yield by Tuber Sizes and Percent of Culls for 16 Russet Potato Varieties Grown for 124 Days on a Sandy Loam Soil at the Rutgers Research & Development Center - Bridgeton, NJ - 1986.

Variety	Total Yield		Spec. Grav.	% Over 4 oz 8 oz		% Culls	Tuber Sizes (1)				
	cwt/a	Market Yield cwt/a					1	2	3	4	5
BELRUS (std)	381	248	1.074	65	10	0	35	55	8	2	0
NORKING	508	418	1.070	82	36	4	14	46	25	8	3
R BURBANK	482	244	1.071	51	11	27	22	39	10	2	0
KATAHDIN	415	347	1.058	84	46	2	14	38	33	9	4
SUPERIOR	460	420	1.068	92	48	1	8	44	33	15	0
A74011-2	205	130	1.079	62	27	5	33	35	23	4	0
A72685-2	367	255	1.080	71	28	1	28	42	21	6	2
A75188-3	330	234	1.061	72	6	1	27	66	6	0	0
AF465- 2	394	189	1.071	48	9	1	51	38	6	2	1
CS73105-2R	485	426	1.061	87	47	3	11	40	27	11	9
ND534-4	509	425	1.062	84	40	5	12	44	28	5	7
WF591-1R	463	382	1.074	82	41	4	14	41	24	12	6
B9540- 55	491	345	1.062	70	10	7	23	60	10	1	0
B9596- 2	533	415	1.060	78	23	6	16	55	18	4	1
NEMARUS	414	319	1.065	77	24	2	21	53	19	5	0
B9569- 2	440	345	1.064	78	31	6	16	47	19	6	6
CV	13	16	4.	8	35						
W-D LSD .05	130	108	.005	13	20						

(1) Size 1 = Under 4 oz, S2 = 4 to 8 oz, S3 = 8 to 12 oz, S4 = 12 to 16 oz, and S5 = Over 16 oz

New Jersey Table 2. Total and Marketable Yield, Specific Gravity, Percent of Yield by Tuber Sizes and Percent of Culls for 25 Round White Potato Varieties Grown for 124 Days on a Sandy Loam Soil at the Rutgers Research & Development Center - Bridgeton, NJ - 1986.

Variety	Total Yield		Spec. Grav.	% Over		% Culls					Tuber Sizes (1)				
	Yield cwt/a	Market Yield cwt/a		1 7/8	2 1/2	1	2	3	4	5	1	2	3	4	5
ATLANTIC	506	477	97	94	65	1	4	29	40	25	0				
CAMPBELL-14	471	441	90	94	70	1	5	24	46	24	0				
DENALI	430	390	79	91	60	3	6	31	44	16	0				
HAMPTON	440	411	83	93	71	2	5	22	33	36	2				
ISLANDER	457	413	84	90	46	1	9	45	41	5	0				
KATAHDIN	440	398	81	90	52	1	9	39	34	18	0				
NORCHIP	501	450	91	89	38	1	10	51	32	6	0				
NORLAND	439	398	81	91	43	2	7	47	38	5	0				
REDSN	357	316	64	88	47	1	10	41	39	9	0				
RHINE RED	321	268	54	83	36	1	16	47	28	8	0				
SUNRISE	458	429	87	94	63	1	6	30	39	25	0				
SUPERIOR (std)	509	490	100	96	65	1	3	32	48	17	0				
Y CHIPPER	487	423	86	87	32	2	12	55	29	2	0				
AF330- 1	427	377	76	88	45	5	7	43	32	12	1				
AF474- 2	455	411	83	90	56	2	8	35	44	12	0				
AF522- 1	499	440	89	88	30	1	11	58	25	6	0				
AF522- 5	432	369	75	85	32	3	12	52	30	2	0				
CF73053- 1	391	368	75	94	49	0	6	44	41	8	0				
CF75023- 1	586	482	98	82	40	2	17	42	31	9	0				
CF76088- 9	521	473	96	91	57	2	7	34	40	17	0				
CF76183- 2	365	332	67	90	36	4	6	54	29	8	0				
CS72032- 4	446	423	86	95	56	0	5	39	48	8	0				
CS72096- 5	532	485	98	91	59	5	4	32	43	15	1				
CS76039- 1	482	440	89	91	66	5	4	25	44	22	0				
CS76097-24	496	447	91	90	56	1	9	34	35	20	1				
CV	10	12		11.	15	4									
W-D LSD .05	63	70		.011	10	5									

(1) Size 1 = Under 1 7/8, S2 = 1 7/8 TO 2 1/2, S3 = 2 1/2 to 3 1/4, S4 = 3 1/4 TO 4, and S5 = Over 4

New Jersey Table 3. Total and Marketable Yield, Specific Gravity, Percent of Yield by Tuber Sizes and Percent of Culls for 40 Round White Potato Varieties Grown for 124 Days on a Sandy Loam Soil at the Rutgers Research & Development Center - Bridgeton, NJ - 1986.

Variety	Total Yield		Spec. Grav.	% Over		% Culls	Tuber Sizes (1)			
	cwt/a	Market Yield cwt/a		1 7/8	2 1/2		1	2	3	4 5
ATLANTIC	497	467	1.077	94	71	1	5	23	39	32 0
BELCHIP	551	517	1.070	94	75	2	4	18	43	32 0
KATAHDIN	484	451	1.058	93	63	0	7	30	41	23 0
SUPERIOR	527	513	1.064	97	67	0	2	30	55	12 0
YUKON GOLD	452	416	1.075	92	54	2	6	37	41	14 0
AB-1	532	496	1.072	93	58	0	6	36	39	19 0
MS700-83	464	443	1.070	95	72	1	4	24	47	24 1
NY71	412	392	1.063	95	62	2	3	33	42	18 1
NY72	310	287	1.062	92	57	1	7	35	37	20 0
NY76	537	492	1.059	92	54	0	8	38	42	11 0
NY77	537	517	1.072	96	72	0	3	24	44	25 2
NY79	523	493	1.058	94	81	3	3	13	36	44 2
NY81	569	553	1.069	97	85	1	2	12	45	37 3
NY82	492	459	1.065	93	58	1	5	36	40	18 0
B9140-32	957	409	1.074	75	49	1	24	26	37	12 0
B9536-8	444	433	1.059	98	81	1	2	16	49	32 0
B9792-2B	507	471	1.082	93	67	2	5	26	43	24 0
DELTA GOLD	324	282	1.064	87	49	1	12	37	39	10 0
B9792-53	449	411	1.083	92	55	1	8	36	47	9 0
B9792-136	526	496	1.066	94	82	2	3	12	44	38 0
CV	36	13	5.	7	14					
W-D LSD .05	ns	78	.005	13	11					

(1) Size 1 = Under 1 7/8, S2 = 1 7/8 TO 2 1/2, S3 = 2 1/2 to 3 1/4, S4 = 3 1/4 TO 4, and S5 = Over 4

New Jersey Table 3. (Continued)

Variety	Total Yield cwt/a	Market Yield % of std.	Spec. Grav.	% O v e r 1 7/8 2 1/2	% Culls	T u b e r 1 2	S i z e s 3 4 5
B9792-149	506	473	1.074	93	2	5	31 43 19 1
B9792-157	609	580	1.068	95	0	5	21 39 33 2
B9843- 2	439	398	1.062	91	2	8	60 27 4 0
B9933- 27	510	480	1.072	94	3	3	19 48 28 0
B9935- 10	482	466	1.061	97	0	3	24 50 23 0
B9935- 14	321	305	1.057	95	1	4	18 35 40 2
B9935- 25	552	506	1.064	92	0	8	37 40 16 0
HUDSON	476	447	1.065	94	3	3	16 40 33 5
B9955- 46	445	409	1.067	91	3	6	25 51 15 0
B9988- 7	546	516	1.069	94	1	4	23 37 33 1
B0011- 3	383	345	1.072	89	2	9	53 32 4 0
B0033- 23	486	437	1.058	90	1	9	46 34 10 0
B0034- 1	599	541	1.074	90	4	6	42 39 10 0
B0034- 9	523	437	1.070	83	1	16	56 27 1 0
B0161- 35	521	483	1.076	93	1	6	48 36 9 0
B0161-113	394	340	1.075	86	2	12	39 35 12 0
B0164- 13	386	317	1.076	82	1	18	64 17 1 0
B0245- 15	440	427	1.066	97	1	2	11 38 49 0
CF75023- 1	626	542	1.063	86	2	11	37 38 11 1
CS76097-24	546	493	1.063	90	4	6	26 37 26 1
CV	36	13	5.	7			14
W-D LSD .05	ns	78	.005	13			11

(1) Size 1 = Under 1 7/8, S2 = 1 7/8 TO 2 1/2, S3 = 2 1/2 to 3 1/4, S4 = 3 1/4 TO 4, and S5 = Over 4

New Jersey Table 4. Total and Marketable Yield, Specific Gravity, Percent of Yield by Tuber Sizes and Percent of Culls for 16 Round White Potato Varieties Grown for 150 Days on a Loamy Soil at the Rutgers Vegetable Research Farm in New Brunswick, NJ - 1986.

Variety	Total Yield		Spec. Grav.	% Over		% Culls	Tuber Sizes (1)				
	cwt/a	Market Yield cwt/a		1 7/8	2 1/2		1	2	3	4	5
DELTA GOLD	158	132	1.068	83	37	7	10	46	31	7	0
YUKON GOLD	293	257	1.074	87	68	10	3	19	38	28	2
DENALI	247	206	1.079	83	44	8	9	40	37	7	0
NY79	298	247	1.059	83	68	14	3	15	27	34	7
NY81	356	295	1.069	83	66	14	3	18	26	37	2
B9988- 7	338	232	1.073	69	54	28	3	15	26	28	1
HUDSON	262	230	1.073	89	75	9	2	14	35	32	8
BELCHIP	328	285	1.067	87	72	10	3	15	33	38	2
CAMPBELL-14	415	356	1.063	87	65	7	6	22	39	25	2
KATAHDIN	314	280	1.061	89	70	7	4	19	28	40	2
CF75023- 1	462	345	1.058	74	38	14	12	36	31	7	0
B9140- 32	282	238	1.072	85	43	9	6	42	34	9	0
ATLANTIC	408	383	1.080	94	68	4	3	26	44	23	1
GS76097-24	346	261	1.062	75	39	11	13	37	27	12	0
HAMPTON	323	293	1.060	91	60	5	4	31	30	30	0
SUPERIOR (std)	336	308	1.058	91	60	6	3	32	46	14	0
CV	18	21	6.	9	17						
W-D LSD .05	85	86	.005	11	14						

(1) Size 1 = Under 1 7/8, S2 = 1 7/8 TO 2 1/2, S3 = 2 1/2 to 3 1/4, S4 = 3 1/4 TO 4 and S5 = Over 4.

New Jersey Table 5. Total and Marketable Yield, Specific Gravity, Percent of Yield by Tuber Sizes and Percent of Culls for 15 Round White Potato Varieties Grown for 150 Days on a Loamy Soil at the Adelphia Soils and Crops Research Farm in Adelphia, NJ - 1986.

Variety	Total Yield		Market Yield		Spec. Grav.	% O v e r		% Culls	T u b e r S i z e s (1)			
	cwt/a	Yield	cwt/a	% of std.		1 7/8	2 1/2		1	2	3	4
ATLANTIC	491		442	115	1.074	90	58	6	4	33	38	19
CAMPBELL-14	411		360	93	1.063	87	60	7	6	27	38	21
DENALI	429		373	97	1.085	87	53	7	6	34	40	13
HAMPTON	418		363	94	1.061	86	59	7	6	28	37	22
KATAHDIN	379		331	86	1.059	84	63	12	4	22	33	30
SUNRISE	407		357	92	1.062	88	58	7	5	30	37	20
SUPERIOR (std)	417		384	100	1.059	91	58	4	5	34	48	10
CF75023- 1	530		427	111	1.067	81	45	11	8	36	35	10
CS73105-2R	329		286	74	1.056	86	62	9	5	24	41	18
NY64	482		387	100	1.064	80	52	14	6	28	29	22
NY71	241		224	58	1.059	93	66	2	5	27	37	29
NY72	368		310	80	1.075	84	59	12	4	25	33	26
NY76	439		372	96	1.061	84	37	3	12	47	30	7
NY79	333		296	77	1.054	89	58	7	4	31	39	19
NY81	522		461	120	1.064	88	69	9	3	20	31	38
CV	15		18		4.	5	15					
W-D LSD .05	89		97		.004	8	13					

(1) Size 1 = Under 1 7/8, S2 = 1 7/8 TO 2 1/2, S3 = 2 1/2 to 3 1/4, S4 = 3 1/4 TO 4 and S5 = Over 4.

New Jersey Table 6. Total and Marketable Yield, Specific Gravity, Percent of Yield by Tuber Sizes and Percent of Culls for 14 Russet Potato Varieties Grown for 150 Days on a Loamy Soil at the Soils & Crops Research Farm in Adelphia, NJ - 1986.

Variety	Total Yield		Spec. Grav.	% Over 4 oz	% Tuber Sizes (1)				
	Yield cwt/a	Market Yield cwt/a			% Culls	1	2	3	4 5
BELRUS (std)	274	153	1.069	56	7	37	48	8	0
NORKING	382	276	1.065	72	12	16	31	31	9 1
R BURBANK	425	233	1.068	55	20	25	36	16	3 0
SHEPODY	269	147	1.073	39	23	38	19	9	7 4
A74011-2	296	218	1.071	73	8	18	45	25	3 1
A72685-2	414	259	1.078	62	10	28	30	18	10 3
A75188-3	341	239	1.068	68	13	19	39	20	8 1
AF465- 2	215	90	1.072	43	7	50	41	2	0 0
ND534-4	298	222	1.061	74	7	20	40	22	9 3
WF591-1R	318	223	1.066	69	9	23	42	18	8 1
B9540- 55	193	30	1.061	15	20	65	15	0	0 0
NEMARUS	325	219	1.067	65	6	29	45	16	4 1
B9569- 2	276	179	1.064	64	9	26	46	18	0 0
B9596- 2	394	320	1.055	80	9	11	35	26	14 4
CV	23	30	5.	17					
W-D LSD .05	108	80	.004	14					

(1) Size 1 = Under 4 oz, S2 = 4 to 8 oz, S3 = 8 to 12 oz, S4 = 12 to 16 oz, and S5 = Over 16 oz

New Jersey Table 7. Total and Marketable Yield, Specific Gravity, Percent of Yield by Tuber Sizes and Percent of Culls for 15 Round White Potato Varieties Grown for 150 Days on a Loamy Soil at the Adelphia Soils and Crops Research Farm in Adelphia, NJ - 1986.

Variety	Total Yield cwt/a	Market Yield		Spec. Grav.	% O v e r		% Culls	T u b e r S i z e s (1)				
	cwt/a	% of std.	1 7/8		2 1/2	1		2	3	4	5	
ATLANTIC	451	412	93	1.077	92	55	3	5	37	40	14	0
BELCHIP	457	423	95	1.069	92	65	4	4	28	49	16	0
KATAHDIN	480	412	93	1.061	86	70	11	3	16	35	35	0
SUPERIOR (std)	462	441	100	1.063	95	58	1	3	37	47	11	0
AB-1	408	371	84	1.072	91	50	4	6	40	36	14	0
CS76097-24	405	342	77	1.068	84	44	8	8	39	36	8	0
MS700-83	487	410	92	1.065	84	44	9	6	40	35	9	0
HUDSON	440	404	91	1.069	92	71	5	3	21	36	34	0
NY82	310	275	62	1.059	86	39	4	11	47	27	11	0
B9140- 32	358	321	72	1.070	89	50	5	6	40	39	11	0
B9935- 14	257	226	51	1.058	88	63	6	6	25	43	20	0
B9792- 53	251	206	46	1.078	83	46	9	8	37	38	8	0
B9935- 10	363	343	77	1.056	94	67	3	3	28	51	15	0
B9935- 25	413	344	78	1.064	83	41	7	10	43	30	11	0
B0245- 15	452	424	96	1.067	94	81	4	2	13	32	46	3
CV	18	19		4.	6	17						
W-D LSD .05	103	100		.004	9	14						

(1) Size 1 = Under 1 7/8, S2 = 1 7/8 TO 2 1/2, S3 = 2 1/2 to 3 1/4, S4 = 3 1/4 TO 4 and S5 = Over 4.

New Jersey Table 8. Total and Marketable Yield, Specific Gravity, Percent of Yield by Tuber Sizes and Percent of Culls for 10 Russet Potato Varieties Grown for 150 Days on a Loamy Soil at the Soils & Crops Research Farm in Adelphia, NJ - 1986.

Variety	Total Yield		Market Yield		Spec. Grav.	% Over		% Culls		Tuber Sizes (1)				
	cwt/a	Yield	cwt/a	% of std.		4 oz	8 oz	1	2	3	4	5		
BELRUS (std)	297		196	100	1.068	63	16	6	30	48	12	1	3	
B9391- 2	239		122	62	1.061	50	12	12	38	38	10	2	0	
NEMARUS	323		185	94	1.065	57	17	9	34	41	13	3	0	
B9752- 7	397		287	146	1.064	72	40	17	12	32	27	8	4	
B9812- 2	292		98	50	1.064	34	2	30	37	31	2	0	0	
B9922- 11	342		268	136	1.072	78	43	7	14	35	30	7	7	
B0042- 15	171		75	38	1.006	43	3	8	49	40	1	1	0	
B0042- 16	294		159	81	1.066	52	14	14	34	38	11	2	0	
B0044- 1	275		182	92	1.059	66	31	5	30	35	23	6	2	
B0045- 6	425		270	137	1.066	63	23	5	31	40	19	3	0	
CV	19		30		37.	17	37							
W-D LSD .05	82		77		ns	14	10							

(1) Size 1 = Under 4 oz, S2 = 4 to 8 oz, S3 = 8 to 12 oz, S4 = 12 to 16 oz, and S5 = Over 16 oz

NEW YORK - LONG ISLAND

J.B. Sieczka, D. D. Moyer and R.C. Neese

General Information

Seven replicated variety evaluations, five fertilizer experiments, a spacing study and an observational trial were conducted on Long Island in 1986. A cooking quality rating was conducted on clones grown in 1985.

Methods

The experimental design for all experiments was a randomized complete block. Four replications were used at the Riverhead, N .Y. location and three replications were used at Water Mill, N.Y. At Riverhead, fertilizer was applied at a rate of 1140 lb/A of 7-18-14 in bands at time of planting (4/15/86) and an additional 80 lb/A of nitrogen was applied when plants were four to six inches tall. Rainfall was supplemented with eight irrigations. The land was fumigated in 1985. The Water Mill experiment was fertilized at a rate of 1800 lb/A of 10-20-20 at planting. Irrigation was not used at this location. On August 11, 1986 the vines of all entries were dead. Specific gravity was determined by the hydrometer method. Internal defects were determined on 10 tubers of the 3-1/4-4" or 12 to 16 oz categories for white and russet experiments, respectively.

White

In the early maturity class, the marketable yields of Norchip, AF330-1, CS7697-24, F70021, and NY 79 were not significantly different than the standard Superior (Table 1). The main season clones NY 72 and NY 81 were the only entries that produced significantly higher yields than Katahdin at Riverhead. Tuber appearance of NY 72 is acceptable, however, NY 81 does not appear well suited for tablestock (Tables 2 & 3). The most attractive white skinned clones were NY 64, NY 72, NY 76, NY 77, and NY 80.

Russet

All the russet entries grown at the Long Island Horticultural Research Laboratory except A7411-2 and B0045-12 produced marketable yields that were significantly higher than BelRus (Table 5 & 6). The Idaho entry A72685-2 produced the highest yield. Tubers of this line have a fair to good appearance, however, hollow heart may be a problem. Several entries in this experiment had a relatively smooth white skin. These are Shepody, Tolaas and W752. Tubers of the clones A7411-2, A72685-2 and W752 had specific gravity readings greater than 1.080.

South Fork	The overall yield of clones grown on the South Fork was lower than that of the same clones grown at Riverhead. The yield difference is a combination of the early death of the vines, most likely due to an unusual infestation of melon aphid in the commercial field, and the effect of soil fumigation at the Riverhead site. None of the white skinned clones produced yields that were significantly greater than Katahdin (Table 4). Hudson and NY 77, however, produced yields that were lower than the standard. In the russet experiment on the South Fork, BelRus, NemaRus and B9596-2 produced similar yields (Table 7). The relatively low yield of B9596-2 may be related to small seed size. B9569-2 was the lowest yielding clone.
Nitrogen and Spacing Studies	NemaRus, Shepody, B9596-2 and NY 72 did not respond to nitrogen applications greater than 160 lb/A in 1986 (Tables 8 & 9). Within row spacing of 6, 9 and 12 inches did not affect total of marketable yield of Hampton (Table 10). As spacing widened, the number of tubers/foot decreased and tuber size and external defects increased. Internal defects were not affected by within row spacing.
Cooking Studies	Table 11 gives after cooking darkening rationing for clones tested in 1985. See last year's results for yield information.
Observational Trials	Table 12 lists clones that were identified in the observation trial as one worthy of further evaluation.
Acknowledgements	Seed was provided by Robert L. Plaisted, Cornell University, Raymon E. Webb, USDA and Gregory A. Porter, University of Maine. Special thanks are extended to the Corwith Brothers for providing the land, and assistance in the establishment of the experiment on the South Fork. Thanks are also extended to John Babinsky for the use of harvesting equipment.

Long Island Table 1. Results of Early White Potato Variety Trial, Riverhead, NY 1986. Standard Variety : Superior

Clone ¹	Yield (cwt/A)		% of Std 2-4"	% of Total Yield				Def ²	Spec ³ Grav	Vine ⁴ Mat
	US No.1			2 -	2.5-	3.25-	>4"			
	Total	2-4		2.5"	3.25"	4"				
Superior	527	394	100	29	44	2	0	5M	65	6.5
I.Cobbler	392	179	45	30	16	0	0	21M	66	4.5
Monona	364	226	57	29	31	2	0	9M	59	4.5
Norchip	444	300	76	30	35	2	0	8M	74	6.8
AF330-1	448	347	88	23	52	3	0	9M	66	6.0
CS7697-24	561	372	94	25	39	2	1	16M	62	7.3
F70021	548	436	111	24	49	7	1	7M	60	5.0
NY79	446	353	89	15	49	15	7	7M	60	5.0
Waller- Duncan	(66)	(74)							(4)	
(0.05)										

Clone	<u>Internal defects</u> ⁵					<u>Tuber Data</u> ⁶					Comments ⁷
	HH	BC	<u>Int Nec</u>			App	Color	Text	Shape	Depth	
			Sl	M	S						
Superior	0	0	1	3	0	6.8	Bu	SN	R-O	D	MDE, Sl Irr
I. Cobbler	2	0	0	0	0	3.8	Bu	SN	O	D	Ugly, DE
Monona	7	0	4	1	0	6.3	W	RS	O-R	I	Irr, MDE
Norchip	3	0	1	0	0	6.8	W	RS	R	I	MDAE, Sl Irr
AF330-1	5	1	0	1	0	6.8	W	RS	R-O	I	Sl Irr, L,
CS7697-24	3	0	2	0	0	6.0	W	RS	R-O	I	Irr, Kn, Sk
F70021	5	0	1	2	0	7.8	W	RS	R	S	Some Sk
NY79	19	0	0	0	0	7.0	W	RS	R	S	DSE, Sl Irr

1. Planted 4/15/86, rotobeat 8/11/86, harvested 8/14/86. Within row spacing 9.3". Fertilizer applied at a rate of 1140 lb/A of 7-18-14-4 (MgO) in bands at time of planting, 80 lbs of N sidedressed. Plot size 2 rows X 12', 4 replications.
2. Defects = Total of all defects. Abbreviations for major defects listed in comments. S = sunburn, M = misshapen, G = growth cracks L = prominent lenticels, Sc = scab.
3. Specific gravity determined by hydrometer, 1.0 omitted.
4. Vine maturity rated on 8/8/86 on a scale of 1 to 9, 1 = completely dead, 9 = green and vigorous.
5. Number of tubers with hollow heart, brown center, or internal necrosis of 40 tubers cut (10 per replication), Sl = slight, M = moderate, S = severe.
6. Color - B = brown, C = cream, BR = bright red, Bu = buff, BW = bright white, MR = medium red, P = pink, Pu = purple, W white, T = tan.
Texture - HR = heavy russet, MR = moderate russet, MS = moderately smooth, N = netted, PR = partially russetted, SN = slight net, S = smooth.
Shape - C = cylindrical, O = oblong, L = long, R = round.
Depth - D = deep, I = intermediate, S = shallow, VD = very deep, VS = very shallow.
Appearance - rated on a scale of 1 to 9; 1 = extremely rough, unattractive, 9 = smooth, attractive.
7. Comment abbreviations. Att = attractive, CT = chain tubers, DAE = deep apical eyes, DSE = deep stem end, F = flat, HS = heat sprouts, Irr = irregular, JER = jelly end rot, Kn = knobs, MDAE = moderately deep apical eyes, P = pink, Sk = skinned, Sl = slightly, Sm = small, St = stolons, Y = yellow.

Long Island Table 2. Results of NE107 Main Season Variety Experiment, Riverhead, N.Y. 1986. Standard Variety : Kathadin

Clone ¹	Yield (cwt/A)		% of Std 2-4"	% of Total Yield					Spec ³ Grav	Vine ⁴ Mat
	US No.1			2 -	2.5-	3.25-	>4"			
	Total	2-4		2.5"	3.25"	4"	Def ²			
Katahdin	544	437	100	20	54	6	1	8S	63	5.3
Hampton	499	394	90	19	53	7	1	13L	59	6.5
Hudson	605	470	108	9	51	17	7	12S	72	7.0
Shepody	531	331	76	31	30	1	0	19M	71	6.0
AF236-1	473	348	80	24	47	2	0	15S	71	6.3
AF474-2	441	363	83	22	54	6	0	7M	62	4.3
CF7679-15	530	364	83	14	48	6	4	19S	72	7.5
CS7639-1	510	376	86	20	46	8	1	15G	59	6.0
F74123	621	407	93	21	42	3	1	21M	61	7.0
NY 71	474	395	91	17	57	10	0	8S	63	5.0
NY 72	732	644	148	12	67	9	1	6S	74	8.0
NY 76	631	506	116	24	52	4	1	3S	65	5.0
NY 81	718	566	130	12	57	11	3	11L	72	7.0
Waller- Duncan	(78)	(79)							(4)	
(0.05)										

Clone	Internal defects ⁵					Tuber Data ⁶					Comments ⁷
	HH	BC	Int Nec			App	Color	Text	Shape	Depth	
			Sl	M	S						
Katahdin	1	2	0	0	0	6.8	W	MS	R-O	S	Sl Irr, Sl F
Hampton	1	3	1	0	0	6.5	W	S	R	S	L
Hudson	0	3	4	1	0	5.5	W	MS	MR	I	L, Sl F
Shepody	0	0	1	0	0	3.8	Bu	MS	L	I	Irr
AF236-1	1	0	0	0	0	5.0	Bu	SN	O	S	L
AF474-2	0	1	1	0	0	6.8	Bu	MS	O	S	Sl F, Sl Irr
CF7679-15	8	2	4	2	0	5.3	W	MS	R-O	I	L
CS7639-1	7	0	0	0	0	4.0	W	MS	O-R	S	Irr, MDAE
F74123	5	2	4	3	0	3.0	C	MS	R-O	I	Irr, HS, CT
NY 71	6	1	1	0	0	4.0	Bu	SN	R	I	Irr, MDAE
NY 72	0	1	0	0	0	7.0	Bu	SN	R	I	Sl Irr
NY 76	2	1	2	0	0	7.0	Bu	MS	R-O	S	Sl F
NY 81	14	5	2	0	1	4.0	Bu	SN	R	I	Irr, L

1. Vine killed 9/17/86. harvested 10/13/86, see footnote 1, Table 1.

2.-7. See appropriate footnotes, Table 1.

5. Rated 9/2/86.

Long Island Table 3. Results of Advanced Golden Nematode Resistant Clones
Experiment, Riverhead, N.Y. 1986.
Standard Variety : Katahdin

Clone ¹	Yield (cwt/A)		% of Std 2-4"	% of Total Yield					Spec ³ Grav	Vine ⁴ Mat
	US No.1			2 -	2.5-	3.25-	>4"			
	Total	2-4		2.5"	3.25"	4"	Def ²			
Katahdin	562	462	100	28	50	5	0	4S	64	5.3
Superior	498	370	80	30	42	2	0	6M	64	2.8
B9581-10	554	370	80	14	45	7	2	24M	66	5.5
B9792-53	490	340	74	30	35	4	2	5S	83	7.0
B9792-136	454	360	78	19	51	8	2	10M	70	5.5
NY 64	758	548	119	26	44	3	2	15S	67	4.5
NY 72	738	644	139	23	62	2	0	4S	73	6.3
NY 77	590	470	102	24	50	5	0	6S	60	4.0
NY 78	616	492	107	21	50	9	3	4M	61	6.0
NY 79	526	430	93	12	58	12	9	3S	59	5.0
NY 80	600	466	101	32	43	2	0	7S	59	5.0
NY 81	680	522	113	15	54	8	3	13S	65	7.0
Waller- Duncan	(0.05) (132)	(104)							(4)	

Clone	Internal defects ⁵					Tuber Data ⁶					Comments ⁷
	HH	BC	Int Nec			App	Color	Text	Shape	Depth	
			Sl	M	S						
Katahdin	5	2	1	0	0	7.0	W	MS	R-O	I	Sl Irr, MDAE
Superior	7	1	0	0	0	4.5	Bu	SN	R-O	I	Irr
B9581-10	0	1	3	0	0	3.3	Bu	SN	MO	I	Rough, Irr
B9792-53	5	1	7	0	0	5.8	W	MS	MO	S	F, Sl Irr
B9792-136	6	1	0	1	0	3.3	Bu	MS	MO	I	F, Irr
NY 64	0	1	1	0	0	7.0	W	VS	MO	I	DAE, Pear
NY 72	2	1	1	0	0	7.0	Bu	SN	R	I	Sl Irr
NY 77	2	1	1	0	0	7.0	Bu	MS	R-O	S	Sl Irr, Sl F
NY 78	5	3	1	0	0	8.0	C	MS	MO	I	Sl Irr, Sl F
NY 79	8	0	0	0	0	6.0	C	MS	R	I	DSE, Sl Irr
NY 80	5	2	1	0	0	8.0	C	MS	R	S	P buds, Some Kn
NY 81	12	4	2	1	4	5.0	Bu	SN	R	I	Rough, L

1. Vine killed 9/17/86, harvested 10/13/86. Plot size 1 row x 20'. See footnote 1. Table 1.

2.- 7. See appropriate footnotes, Table 1.

5. Rated 9/2/86.

Long Island Table 4. Results of South Fork White Variety Trial, Water Mill, N.Y. 1986.

Standard Variety : Katahdin

Clone ¹	<u>Yield (cwt/A)</u>		% of Std 2-4"	<u>% of Total Yield</u>		Def ²
	US No.1 Total	2-4		2 - 4"	>4"	
Katahdin	306	252	100	82	2	3S
Hampton	264	208	83	79	1	10G
Hudson	213	166	66	78	0	7G
Shepody	279	209	83	75	2	12M
Superior	282	244	97	87	0	1M
CF7679-15	230	184	73	80	4	7M
NY 72	295	228	91	77	1	6M
NY 77	196	143	57	73	0	5G
NY 79	263	230	91	87	0	4M
NY 80	292	283	112	81	0	2S
NY 81	319	287	114	90	1	3M
Waller- Duncan	(99)	(79)				

Internal defects³

Clone	<u>Int Nec</u>			<u>Tuber Data⁴</u>					Comments ⁵
	HH	BC	Sl	App	Color	Text	Shape	Depth	
Katahdin	0	0	0	8.0	W	S	R	I	Sl F
Hampton	2	0	2	8.0	W	S	R	S	L
Hudson	0	3	2	7.0	W	MS	R	I	Sl Irr
Shepody	0	0	0	6.0	W	S	L	I	Sl Irr
Superior	2	0	1	7.0	Bu	SN	R	D	Sl Irr
CF7679-15	5	3	0	7.0	Bu	MS	R	S	Sl Irr, L
NY 72	0	0	1	7.0	Bu	SN	R	I	MDAE, Sl Irr
NY 77	0	2	2	6.5	Bu	MS	R	S	Irr, Sm
NY 79	6	3	1	7.0	W	MS	R	S	DSE
NY 80	6	0	0	8.0	W	MS	R	S	Some Kn
NY 81	3	1	0	7.0	W	SN	R	I	MDAE, Irr, L

1. Planted 4/9/86, vines dead 8/11/86, harvested 10/6/86. Fertilizer applied at a rate of 1800 lb/A of 10-20-10. Within row spacing 9". Plot size 2 rows X 12', 3 replications.

2.- 5. See appropriate footnotes, Table 1.

3. Thirty tubers cut.

Long Island Table 5. Results of NE 107 Russet Experiment Riverhead, N.Y. 1986.
Standard Variety : BelRus

Clone ¹	Yield (cwt/A)		% of Std 4-16	% of Total Yield					Spec ³ Grav	Vine ⁴ Mat
	US No.1			----- (ounces) -----						
	Total	4-16		4-8	8-12	12-16	>16	Def ²		
BelRus	227	166	100	55	15	3	1	8	66	2.8
NemaRus	341	243	147	47	22	3	1	11	64	4.0
NorKing	356	248	150	54	14	1	0	6	70	3.5
Shepody	620	404	244	31	24	10	7	19	69	6.0
Tolaas	404	316	191	47	25	7	1	7	58	4.5
A7411-2	418	221	134	27	20	6	1	35	86	6.8
A72685-2	620	459	277	38	24	12	2	8	90	7.3
A75188-3	557	389	235	38	25	7	2	12	68	8.0
AF522-1	542	393	237	36	24	13	5	11	74	7.0
B9540-55	479	304	184	40	20	3	1	18	58	7.0
B9569-2	364	271	164	49	22	3	0	9	63	4.0
B9596-2	372	263	159	48	19	3	1	10	62	4.0
B9922-11	445	301	182	38	22	8	4	18	76	6.0
ND534-4	402	261	158	42	20	3	3	15	62	5.0
W752	517	416	252	53	22	5	1	4	83	6.0
Waller- Duncan	(0.05) (66)	(65)							(4)	

Clone	Internal defects ⁵					Tuber Data ⁶					Comments ⁷	
	HH	BC	Int Nec			App	Color	Text	Shape	Depth		
			Sl	M	S							
BelRus	6	1	0	0	0	7.0	DB	HR	L	S	Alligator	
NemaRus	1	0	1	1	0	6.8	B	MR	L	S		
NorKing	5	0	1	0	0	6.5	B	MR	L	S		
Shepody	2	1	0	0	0	6.3	W	MS	L	I		Sl F
Tolaas	0	0	3	0	0	6.3	W	S	O-L	I		Sl F
A7411-2	0	0	2	0	0	3.3	B	MR	C	I-S	"Skinny"	
A72685-2	8	1	0	0	0	6.3	B	MR	O-L	S		
A75188-3	4	0	0	0	0	5.0	W-T	PR	L	I		
AF522-1	0	0	2	0	0	7.0	B	PR	ML	S		
B9540-55	0	0	4	1	0	4.0	B	H-MR	C	S	"Skinny", HS, JER	
B9569-2	5	0	3	0	0	6.0	B	HR	O-L	S	Sl Irr	
B9596-2	0	1	3	0	0	7.0	B	M-PR	L	S		
B9922-11	1	0	0	0	0	7.0	B	H-MR	L	S		
ND534-4	0	0	1	0	0	6.0	B	MR	L	S	Irr, L	
W752	0	0	0	0	0	7.0	W	S	O-L	S	Sl F, Sl Irr	

1. Vine killed 9/17/86, harvested 10/13/86. Plot size 1 row x 20'. See Footnote 1, Table 1.

2. - 7. See appropriate footnotes, Table 1.

5. Rated 9/2/86.

Long Island Table 6. Results of USDA Russet Experiment, Riverhead, N.Y. 1986.
Standard Variety : BelRus

Clone ¹	<u>Yield (cwt/A)</u>		% of Std 4-16	<u>% of Total Yield</u> ----- (ounces) -----					Spec ³ Grav	Vine ⁴ Mat
	Total	US No.1 4-16		4-8	8-12	12-16	>16	Def ²		
BelRus	232	173	100	57	13	4	2	7M	67	1.5
NemaRus	443	353	204	46	26	7	0	9M	65	3.3
B9391-2	380	265	153	42	21	8	5	8M	68	5.0
B9922-11	407	320	185	45	25	8	1	3M	61	2.5
B0042-15	302	218	126	56	14	2	0	6G	68	4.8
B0045-12	312	215	124	62	7	0	0	5M	72	3.3
Waller- Duncan (0.05)	(44)	(44)							(4)	

Clone	<u>Internal defects⁵</u>					<u>Tuber Data⁶</u>					Comments ⁷
	HH	BC	<u>Int Nec</u>			App	Color	Text	Shape	Depth	
			Sl	M	S						
BelRus	2	0	1	0	0	7.0	DB	HR	L	S	Alligator
NemaRus	2	0	0	0	0	7.5	B	MR	L	S	Sl Irr
B9391-2	3	8	0	0	0	6.0	B	MR	L	S	Sl Irr
B9922-11	0	0	4	0	0	7.0	B	PR	C-L	S	Sl Irr, Sl F
B0042-15	4	0	8	2	0	6.5	B	HR	C	S	Sl Irr, Some HS
B0045-12	5	0	2	0	0	6.0	B	M-HR	L	S	Sl Irr

1. Vine killed 9/17/86, harvested 10/13/86. Plot size 1 row x 20'. See Footnote 1, Table 1.

2. - 7. See appropriate footnotes, Table 1.

5. Rated 9/2/86.

Long Island Table 7. Results of South Fork Russet Variety Trial, Water Mill, N.Y. 1986.

Standard Variety : BelRus

Clone ¹	<u>Yield (cwt/A)</u>		% of Std 4-16	<u>% of Total Yield</u>				Def ²
	US No.1			----- (ounces) -----				
	Total	4-16		4-8	8-12	12-16	>16	
BelRus	201	139	100	41	15	12	0	7M
NemaRus	252	178	128	25	22	23	5	11M
B9569-2	197	113	82	40	14	4	0	12M
B9596-2	214	162	117	46	23	7	0	4G
Waller- Duncan	(54)	(49)						
(0.05)								

Clone	<u>Internal defects³</u>					<u>Tuber Data⁴</u>					Comments ⁵
	HH	BC	<u>Int Nec</u>			App	Color	Text	Shape	Depth	
			Sl	M	S						
BelRus	1	0	0	0	0	8	B	HR	L	S	Sl F
NemaRus	0	0	0	0	0	8	B	MR	L	S	Sl F
B9569-2	0	0	3	0	0	8	B	MR	L	S	Sl Irr
B9596-2	1	1	0	0	0	8	B	MR	L	S	

1. See footnote 1, Table 4.

2. - 5. See appropriate footnotes, Table 1.

3. Thirty tubers cut.

Long Island Table 8. The effect of nitrogen rate on yield, size distribution, quality and specific gravity of three potato clones with long tubers - Riverhead, N. Y. 1986.

Clone	N Rate ¹ (lb/A)	Yield (cwt/A)		% of Std. 4-16"	% of Total Yield					Spec ³ Grav.	Vine ⁴ Mat.
		Total	US No.1 4-16"		----- (ounces) -----						
					4-8	8-12	12-16	>16	Def ²		
NemaRus	160	503	378	100	41	28	6	2	6	67	3.8
	190	511	375	99	39	25	9	4	6	69	5.0
	210	511	405	107	37	31	12	2	5	67	4.8
Waller-Duncan(0.05)		(ns)	(ns)							(ns)	
=====											
Shepody	160	525	369	100	35	26	9	4	29	73	6.8
	190	512	357	97	32	25	12	3	21	73	7.5
	210	495	349	95	35	27	9	2	21	71	7.8
Waller-Duncan(0.05)		(ns)	(ns)							(ns)	
=====											
B9596-2	160	474	383	100	45	27	9	2	5	63	3.5
	190	494	386	101	40	30	8	3	6	63	3.8
	210	477	355	93	41	26	7	2	11	66	4.0
Waller-Duncan(0.05)		(ns)	(ns)							(ns)	

Clone	N Rate (lb/A)	Internal defects					
		HH	BC	Sl	Int Nec		App ⁵
					M	S	
NemaRus	160	1	0	0	0	0	7.5
	190	1	1	1	0	0	7.5
	210	1	1	0	0	0	7.3
Shepody	160	1	1	2	1	0	4.0
	190	0	1	1	0	0	4.0
	210	1	0	2	0	0	4.0
B9596-2	160	1	0	6	2	2	7.0
	190	0	0	4	2	1	7.3
	210	0	0	3	3	0	7.0

1. Planted 4/16/86, vine killed 9/17/86 and harvested 10/21/86. Within row spacing 9.3". Nitrogen was applied at a rate of 80 lb/A when plants were 4 to 6" tall. The other portion of the nitrogen was applied at planting in combination with 300 lb/A of P₂O₅, 150 lb/A of K₂O and 50 lb/A of MgO. Plot size: 3 rows x 30', the center 25' of the center row was used for data. Experimental design is a randomized complete block with 4 replications.

2. - 5. See appropriate footnotes Table 1.

Long Island Table 9. The effect of nitrogen rate on yield, size distribution, quality and specific gravity of NY 72, Riverhead, N.Y. 1986

N Rate ¹ (lb/A)	Yield (cwt/A)		% of Std. 2-4"	% of Total Yield					Spec ³ Grav.	Vine ⁴ Mat.
	Total	US No.1 2-4"		---- (ounces)-----						
				2- 2.5"	2.5- 3.25"	3.25- 4"	>4	Def ²		
160	561	486	100	25	60	2	0	5	75	5.3
190	585	500	103	22	63	1	0	7	77	6.8
210	557	497	102	22	64	3	0	4	77	7.3
Waller- Duncan (0.05)	(ns)	(ns)							(ns)	

N Rate (lb/A)	<u>Internal defects</u>					App ⁵
	HH	BC	<u>Int Nec</u>			
			Sl	M	S	
160	0	0	0	0	0	6.3
190	1	0	0	0	0	6.0
210	1	0	0	0	0	6.5

1. See footnote 1, Table 5.

2.- 5. See appropriate footnotes, Table 1.

Long Island Table 10. The effect of spacing on yield and quality of Hampton, 1986.

Spacing (in.)	Tuber No/ft	Mean Tuber Wt (oz)	Yield (cwt/A)		% of Total Yield					Def ²	Spec ³ Grav.
			Total	2-4"	<2	2"	2.5"- 2.5"	3.25"- 3.25"	>4 4"		
6	12.0	5.4	620	550	9	26	60	3	0	2	62
9	9.8	6.5	611	550	6	18	64	9	0	3	62
12	8.4	7.7	620	513	6	16	60	12	1	5	62
Waller- Duncan(0.05)			(ns)	(ns)						(ns)	

1. Planted 4/25/86, vine killed 9/17/86, harvested 10/21/86. Plot size 3 rows x 25', center 21' of center row used for yield data, 5 replications.

2.- 3. See appropriate footnotes, Table 1.

Long Island Table 11. After-cooking ratings of clones grown in 1985¹.

<u>NE 107 White</u>		<u>Advanced GN</u>		<u>NE 107 Russet</u>		<u>USDA Russet</u>	
Clone	Rating	Clone	Rating	Clone	Rating	Clone	Rating
Katahdin	4.9	Katahdin	4.1	BelRus	4.9	BelRus	4.9
Hampton	4.8	Hampton	4.7	Acadia	4.4	NemaRus	3.4
Hudson	4.7	Hudson	4.1	NemaRus	3.9	B9553-6	4.2
Shepody	4.9	B8710-1	5.0	Russette	3.6	B9569-2	4.6
AF303-5	3.8	B9192-1	4.6	B9569-2	4.3	B9596-2	3.9
AF474-2	4.9	B9581-10	5.0	B9596-2	4.0	B9752-7	4.1
CF7523-1	4.9	B9792-53	4.3	WF591-1	4.3		
CF7688-9	4.7	NY 72	4.5				
F74123	4.8	NY 75	4.8				
NY 64	4.8	NY 76	5.0				
NY 72	4.8	NY 77	4.8				
W718	4.6	NY 78	4.8				
		NY 80	4.5				
Waller							
Duncan(0.05)							
	(0.4)		(0.4)		(0.4)		(0.6)

1. For yield data see VC Report 329, 1985 Long Island Potato Variety Trial Results. Ratings based on scale of 1 to 5; 5 = no darkening, 1 = severe after cooking darkening. Five tubers rated per replication; four replications in each experiment.

Table 12. 1986 observational trial, clones with good yield and/or appearance.

Clone ¹	Internal Defects ²					Spec. ³	Tuber Data ⁴			App	Comments ⁵
	HH	BC	SL	M	S		Color	Tex.	Shape		
Katahdin	-	-	-	2/60	4/60	66	W	MS	R	7.4	Good yield
Superior	-	-	9/50	2/50	1/50	67	W-Bu	M	R-O	6.8	Mod yield, MDE
BelRus	-	-	2/50	-	1/50	69	B	HR	L	7.0	Low yield
B9885-2	-	-	-	1	2	67	B	M-HR	L	8.0	SE, OK
B9922-4	-	-	-	-	-	68	B	MR	L-O	8.0	Vari. size,SE, Mod Yld
B9922-11	-	-	-	1	-	78	T	MR	L	8.0	Nice SE, Good yield
B9931-1	5	-	-	-	-	73	W	MS-SN	R	7.0	Good yield
B9932-43	-	-	-	-	2	84	B	MR	O-L	8.0	Good yield
B9935-8	-	-	-	-	-	59	Bu	MS	R	7.0	Lg, good yield
B9935-14	1	-	-	-	1	62	W	MS	R	7.0	Good yield
B9988-7	-	-	-	-	-	74	Bu	S	O	8.0	Med lg, SE,Var size
B0011-16	-	-	5	2	1	65	B	MR	L	8.0	Var size, SE
B0015-43	2	-	-	-	-	67	B	LR	O-L	8.0	Good yield
B0049-4	-	-	-	-	-	68	B	MR	L	8.0	SE
B0052-36	1	3	1	-	-	<57	W	S	R	8.0	Good yield
B0058-29	-	-	-	-	-	73	Bu	SN	R	8.0	Med size,Nice
B0158-23	-	2	-	-	-	70	W	MS	R	8.0	SE, good yield,var size
B0161-35	-	-	-	1	-	76	Bu	S	O	8.0	SE, sl irr, Pk B

1. 20-hill plots, not replicated except for Katahdin which was replicated six times and Superior and BelRus which were replicated 5 times. See footnote 1, Table 1.

2. Number of tubers with defects of 10 tubers cut. For standard varieties numerator = number of defects, denominator = number of tubers cut.

3 - 5. See appropriate footnotes, Table 1.

NEW YORK - UPSTATE

D. E. Halseth and W. L. Hymes

Program Scope	<p>The Vegetable Crops Department, Cornell University, conducted ten replicated variety yield trials distributed across five counties in upstate New York in 1986 in which a total of 26 named varieties and 63 advanced numbered clones were evaluated. Only data from the Thompson Vegetable Research Farm at Freeville, Tompkins County, is included in this report. Additional information on the other county trials as well as variety x N-fertilization, storage and chipping research can be obtained from the authors.</p>
Research Farm	<p>All 89 entries mentioned above were evaluated in randomized complete block plots which were replicated four times. These experiments were planted at 9" spacing on a 34" bed with 1200 lbs/A of 13-13-13 applied in bands at planting on a Howard gravelly loam soil. No irrigation was used in the 1986 season. Seedpiece treatment was Tops 2.5 D-F and weed control consisted of Lorox 50WP at 3 lb/A preemergence on May 20/22. Insect control utilized applications of Furadan, Guthion, Monitor and Thiodan. Disease control of foliar pathogens used Dithane M-45, Manex 37F, Manzate 200 and Super-tin 4L. Hilling was accomplished between June 10 -17 and vine kill used Premerge 3SC (kill dates on tables).</p>
Seasonal Observations	<p>Problems encountered in 1986 were primarily associated with very wet conditions. Spring planting began with warm, dry conditions, but by mid May rain began and did not let up until well after harvest. Green tubers were the largest external defect, with bruising damage also a major concern because skins were not able to fully set in the wet conditions. Early blight and scab were not a problem, but Rhizoctonia and silver scurf were observed on many lines.</p>
Promising Clones and Varieties	<p>Named white varieties with golden nematode (GN) resistance which consistently yield well are Atlantic and Elba. Round white GN resistant numbered clones which continue to perform very well are NY72 and NY81. Currently there are no GN resistant russet or red skinned varieties with suitable tuber size or yield under upstate conditions. Two new non-GN russet entries, A72685-2 and A7411-2, as well as the older GN clone B7592-1, had good yields and french fry potential. The best chipping varieties and breeding lines are Atlantic, Monona, B0011-3 and B9955-46. The earliest maturing entry was NY79, which still out yielded Superior by 17%, while Elba was the latest maturing entry, yielding 10% more marketable tubers than Katahdin.</p>

Table Headings
Explanation

Sizes used for marketable yield of indicated potato types are:

White: 1-7/8" to 4" in diameter.
Russet: 4 to 16 ounces.

% (VARIETY) YIELD represents the percentage that each entry's marketable yield is of that of a specified standard variety.

Percent of total yield is the weight of a specific size category divided by total yield (including defects). The letter codes for the various sizes correspond to the following parameters:

White: A = less than 1-7/8" in diameter
B = 1-7/8" to 2-1/2"
C = 2-1/2" to 3-1/4"
D = 3-1/4" to 4"
E = over 4"

Russet: A = less than 4 ounces
B = 4 to 8 ounces
C = 8 to 12 ounces
D = 12 to 16 ounces
E = over 16 ounces

External defects (EXT DEF) is comprised of four classes of defects: G = green C = growth crack
K = excessively knobby, misshapen R = rot

If a class of external defect exceeds 5% of total yield, the appropriate letter code is placed next to the external defect percentage.

Internal defects (INT DEF) represents the number of tubers examined out of 40 which when cut in half showed significant symptoms of the three following defects:

H = hollow heart
V = vascular discoloration
N = internal necrosis

Specific gravity (SPEC GRAV) was determined by potato hydrometer. A "1.0" has been dropped from entries which had readings in the hundredths place, while a "1." has been omitted from those which had readings in the tenths position.

General external appearance (GEN APP) was subjectively evaluated using the following scale:

1 = extremely rough or otherwise unattractive
9 = very smooth and otherwise unattractive

Vine maturity ratings (VINE MAT) were also subjectively evaluated. These ratings, which were made just a day or two prior to vine killing, were based on the scale:

1 = all plants completely dead (very early)
9 = all plants full green (very late)

UPSTATE NEW YORK TABLE 1. EARLY MATURITY VARIETY TRIAL - FREEVILLE, NEW YORK, 1986

VARIETY	% SUP PCT OF TOTAL YIELD										AVG		INT								
OR CLONE	YIELD(CWT/A)		YIELD		MKT					EXT		TUBER		DEF		SPEC		TUBER		VINE	
	TOTAL	MKT	MKT	A	B	C	D	E	DEF	NO/FT	WT(OZ)	H	V	N	GRAV	APP	MAT				
NY79	331	305	117	5	14	63	15	0	3	6.4	5.4	0	0	0	86	6.0	2.3				
CF7523-1	422	304	117	7	21	50	8	0	13 C	8.0	5.4	0	0	0	89	6.5	4.8				
NY80	339	276	106	19	38	38	2	0	3	9.3	3.8	1	0	0	86	6.8	2.5				
NY76	303	266	102	9	38	45	4	0	4	8.3	3.6	1	0	0	82	6.3	3.0				
F70021	311	263	101	11	28	48	7	1	5	7.5	4.3	0	0	0	83	6.8	4.3				
SUPERIOR	287	261	100	10	29	54	6	0	1	7.0	4.2	0	1	0	92	5.0	3.5				
SUNRISE	293	240	92	7	14	56	11	0	13 C	5.7	5.2	0	0	0	90	4.8	4.0				
MONONA	247	217	83	12	30	53	3	0	2	6.3	4.0	1	0	1	81	5.5	5.3				
B0011-3	206	180	69	7	18	62	7	0	6	4.4	4.8	16	1	0	94	4.5	4.5				
NY83	159	137	52	12	39	43	3	0	2	4.9	3.3	0	0	0	91	6.5	2.8				
SIMCOE	157	135	52	9	20	51	12	0	7	3.7	4.3	0	0	0	91	6.0	4.5				
WALLER-DUNCAN																					
MSD (.05)	115	68								1.6	1.4				3						
C.V. (%)	(28)	(20)								(18)	(20)				(3)						

PLANT DATE - MAY 8
VINE KILL DATE - AUGUST 25 (MOWED)
HARVEST DATE - AUGUST 28

UPSTATE NEW YORK TABLE 2. MEDIUM MATURITY VARIETY TRIAL - FREEVILLE, NEW YORK, 1986

VARIETY	% KAT PCT OF TOTAL YIELD										AVG		INT					
OR	YIELD(CWT/A)		YIELD		MKT					EXT	TUBER	NO/FT	WT(OZ)	DEF	SPEC	TUBER	VINE	
	TOTAL	MKT	MKT	MKT	A	B	C	D	E									DEF
CLONE																		
ATLANTIC	378	351	115	3	8	48	37	1	4		5.9	6.7	0	0	0	97	5.5	6.0
NY77	376	337	111	7	20	57	13	1	2		7.8	5.0	0	2	0	81	5.0	1.5
F74123	360	333	109	4	17	61	14	0	3		6.6	5.7	0	1	8	79	6.3	3.3
NY78	355	328	108	5	16	59	18	0	2		6.2	5.9	0	0	0	76	7.8	5.8
NY64	345	318	105	4	19	57	17	0	4		6.4	5.6	0	1	0	82	6.8	2.0
KATAHDIN	346	304	100	4	15	54	19	1	7	G	6.0	5.9	0	0	0	82	5.8	6.5
NY82	334	292	96	8	20	56	12	0	4		7.1	4.9	0	1	0	79	6.8	3.5
B9988-7	328	290	95	4	11	47	31	5	2		5.2	6.6	2	0	0	87	5.3	2.5
B9792-157	331	289	95	5	10	38	39	4	4		5.2	6.7	2	1	0	86	3.5	4.5
W752	314	288	95	5	21	57	13	1	3		6.3	5.2	0	0	0	97	3.5	3.0
B9955-46	304	287	94	3	12	45	37	0	3		4.9	6.5	0	0	0	82	5.5	3.0
B9955-28	273	240	79	4	11	59	17	1	7	G	5.2	5.5	0	0	1	74	5.8	1.3
WALLER-DUNCAN																		
MSD (.05)	59	54									1.1	0.6				2		
C.V. (%)	(11)	(11)									(13)	(8)				(2)		

PLANT DATE - MAY 9
VINE KILL DATE - SEPTEMBER 2
HARVEST DATE - SEPTEMBER 8

UPSTATE NEW YORK TABLE 3. LATE MATURITY VARIETY TRIAL - FREEVILLE, NEW YORK, 1986

VARIETY		% KAT			PCT OF TOTAL YIELD					AVG		INT					
OR	YIELD(CWT/A)	YIELD			MKT					TUBER	WT(OZ)	DEF	SPEC	TUBER	VINE		
		TOTAL	MKT	MKT	A	B	C	D	E							DEF	EXT
CLONE																	
NY81	406	374	123	2	6	42	45	5	1	5.5	7.7	1	0	1	89	6.0	7.5
NY72	377	337	111	3	8	46	36	2	6	6.0	6.7	1	1	0	91	5.5	7.8
ELBA	370	335	110	4	9	55	26	0	6	6.1	6.3	1	0	0	93	5.3	8.8
KATAHDIN	335	304	100	4	11	64	16	0	5	6.1	5.7	1	1	0	78	6.3	6.0
AF236-1	356	297	98	3	13	54	16	1	13	5.4	6.9	2	0	1	88	5.8	6.5
HAMPTON	337	291	96	3	9	51	26	1	9	5.5	6.4	1	0	0	80	7.0	5.0
B9935-8	289	269	89	3	8	43	42	1	3	4.2	7.1	1	3	0	77	6.3	2.0
NY71	293	262	86	3	10	49	30	1	7	5.2	5.9	0	0	2	86	5.3	5.5
B9935-14	249	225	74	5	15	60	14	0	5	4.7	5.5	0	2	0	79	4.8	2.5
B9955-18	267	216	71	4	9	49	23	0	15	4.3	6.5	0	0	1	92	5.5	2.5
B9792-1B	240	198	65	6	21	57	5	0	12	5.3	4.7	1	0	0	90	5.3	1.0
B9792-2B	239	191	63	6	18	54	8	0	14	4.9	5.1	0	4	0	95	4.0	2.5
WALLER-DUNCAN																	
MSD (.05)	44	44	1.0	0.7	3												
C.V. (%)	(11)	(12)	(12)	(9)	(3)												

PLANT DATE - MAY 9
VINE KILL DATE - SEPTEMBER 2
HARVEST DATE - SEPTEMBER 10

UPSTATE NEW YORK TABLE 4. RUSSET VARIETY TRIAL - FREEVILLE, NEW YORK, 1986

VARIETY	PCT OF TOTAL YIELD										AVG		INT	
	%RB		YIELD		MKT		EXT		TUBER		TUBER		SPEC	
OR	YIELD(CWT/A)		MKT		MKT		EXT		NO/FT		WT(OZ)		GRAV	
CLONE	TOTAL	MKT	MKT	A	B	C	D	E	DEF	DEF	H	V	N	MAT
A72685-2	394	274	163	21	44	21	6	4	5	7.6	5.4	1	0	8.3
A7411-2	375	271	161	19	52	15	6	2	6	7.3	5.3	0	0	8.0
B0036-6	305	236	140	14	48	26	3	5	4	5.4	5.9	2	0	3.0
WF564-3	316	204	121	16	57	9	0	0	19 C	7.1	4.6	0	1	1.5
B9922-11	259	187	111	11	40	23	9	3	14 C	4.6	5.8	6	0	6.0
B9596-2	250	178	106	21	58	13	1	1	6	5.1	5.1	0	0	4.3
KRANTZ	222	171	101	11	51	19	8	2	10	3.9	5.9	0	1	2.0
RUS BURBANK	348	168	100	34	41	6	1	0	18	8.0	4.5	1	2	6.8
B0045-6	273	166	99	24	44	16	3	0	14 C	6.0	4.7	3	0	2.8
BELRUS	189	127	76	28	60	7	0	0	6	4.7	4.2	3	0	2.5
B0039-20	214	114	68	43	49	5	0	0	3	6.2	3.7	1	0	1.3
NEMARUS	168	113	67	25	48	15	3	0	9 G	3.7	4.7	0	0	3.0
B9959-15	172	106	63	26	50	12	0	1	12 K	4.1	4.4	0	0	2.0
B9569-2	167	101	60	35	54	3	1	0	7	4.4	3.9	0	1	1.0
AGASSIZ	177	85	50	49	46	2	0	0	3	4.9	4.2	0	1	1.0
B0042-11	198	63	38	37	30	2	0	0	31 C	6.2	3.3	2	0	1.0

WALLER-DUNCAN

MSD (.05)	63	46	1.4	0.7	4
C.V. (%)	(19)	(22)	(19)	(11)	(3)

PLANT DATE - MAY 9

VINE KILL DATE - SEPTEMBER 2

HARVEST DATE - SEPTEMBER 9

UPSTATE NEW YORK TABLE 5. FRENCH FRY PROCESSING VARIETY TRIAL - FREEVILLE, NEW YORK, 1986

VARIETY		%RB				PCT OF TOTAL YIELD				AVG		INT			
OR	CLONE	YIELD(CWT/A)		YIELD		MKT		EXT		TUBER		DEF		SPEC	
		TOTAL	MKT	MKT	A	B	C	D	E	DEF	NO/FT	WT(OZ)	H	V	N
B7592-1	WHI	367	341	177	4	19	63	11	1	1	6.5	5.9	0	3	0
KENNEBEC	WHI	353	299	155	3	12	53	19	0	13	5.5	6.5	0	3	1
CAMPBELL 14	WHI	307	275	142	6	13	61	15	0	5	5.8	5.6	0	1	0
YANK CHIPPER	WHI	279	242	125	9	30	52	5	0	4	6.0	4.9	0	1	0
DENALI 1/	WHI	247	223	115	5	17	60	14	0	5	4.4	6.0	0	13	0
SHEPODY 1/	RUS	277	216	112	14	36	27	15	3	5	4.5	6.4	0	3	0
NORKING RUS	RUS	269	194	101	25	55	16	1	2	1	5.4	5.2	0	0	0
RUS BURBANK	RUS	345	193	100	40	46	9	1	1	5	8.0	4.5	0	5	2
NOOKSACK	RUS	257	186	96	27	45	22	5	0	1	5.1	5.3	0	1	0
ND534-4	RUS	235	180	93	22	46	27	4	0	2	4.5	5.4	2	2	0
LEMHI	RUS	209	140	73	16	27	28	12	9	7	3.3	6.6	2	2	3
BELRUS	RUS	151	76	39	50	43	4	1	0	2	3.6	4.3	0	0	0
WALLER-DUNCAN															
MSD (.05)		54	49								1.0	0.8		4	
C.V. (%)		(14)	(17)								(14)	(10)		(3)	

PLANT DATE - MAY 9
VINE KILL DATE - SEPTEMBER 2
HARVEST DATE - SEPTEMBER 10

1/ Although it is a white, because of its elongated shape Shepody was graded as a russet (by weight rather than diameter).

NEW YORK

R. L. Plaisted, R. W. Hoopes, H. D. Thurston, B. B. Brodie, and W. M. Tingey

Crossing and Seedling Production: During the winter and spring, 29 crosses were made for chipping type progenies and 41 for long russet types, though one cross, Bake-King x bulk pollen of golden nematode resistant clones predominated. One hundred thirty-five neotuberosum clones were crossed to a bulk of ten nematode resistant tuberosum clones. These will be used for variety selection as well as germplasm development. For further germplasm development, 20 neotuberosum clones were intercrossed, 47 crosses among plants with glandular trichomes were made, and 29 crosses between tuberosum and neotuberosum clones resistant to Meloidogyne hapla and M. chitwoodi were made. For seedling tuber production, 83,000 Tbr x Tbr seedlings were transplanted and 30,000 Neotbr x Tbr seedlings were transplanted. The latter seedlings were seedling inoculated with PVX and PVY. From the first set, 68,000 tubers were harvested, and from the second, 17,000. Twenty acres of seedling hills at Willsboro produced 15,284 single tuber selections and 574 single hill russet selections.

Early Generation Selections: There are about 1,400 selections in the third generation which are being screened for resistance to the golden nematode. We expect about 900 to be resistant. In the fourth generation, there are 113 survivors, following frying trials, and in the fifth generation, 27 survivors.

Advanced Selections: The following clones were described in the 1985 report. NY71 continues to look very promising as a golden nematode resistant alternative to Monona. NY72 and NY81 were given widespread evaluation and continued to perform well for yield and marketability. This year NY81 did not chip as well as NY72 and this year we experienced some surface checking thought to be associated with Rhizoctonia. NY79 continued to perform as in the past, though there was more hollow heart on Long Island than in other years. NY78 continues to look promising as a tablestock variety. The clones NY64, NY76, NY77, NY80, NY82, and NY83 will be discontinued from further evaluation.

There are nine clones in the generation of crosses made in 1980. Three of these look promising. D191-2 is a late maturing deep-red colored clone. It has a full season yield as good as Katahdin and an early harvest yield like Superior. It is resistant to the golden nematode and scab, but very low in specific gravity and will not chip. D195-11 and D195-16 are from a cross to Chipbelle. They chip well from 45° storage and have good specific gravity. Their yields are not as high as Katahdin. The first of these has midseason maturity and the second is an early maturing clone.

Germplasm Development: The primary germplasm development now is with glandular trichomes. This year we are making the sixth generation of intercusses or backcrosses following selection for trichome density and browning potential. The neotuberosum program is now being advanced as a hybrid population with tuberosum. This population segregates for resistance to PVY, PVX, late blight, and the golden nematode. Also present, but not a routine in the selection program is resistance to scab and wart. A few of these clones were found to be resistant to scab and wart. A few of these clones were found to be resistant to Meloidogyne chitwoodi and M. hapla and have been entered into a small program of evaluation, confirmation, and further crossing to tuberosum. Another population is being created which has the potential of being heat tolerant with resistance to late blight, bacterial wilt, Meloidogyne spp., PVX and PVY. This will receive a field evaluation next year.

Seed Production: All the advanced selections and the parents used in crossing are maintained in vitro and tested for viruses and viroid. These in vitro plantlets provide cuttings for an "elite" plot, which in turn provides tubers for the isolated seed plot. Tubers from the seed plot are used for yield trials and a few are further multiplied at Canton, N.Y. The Canton production is used to contract with a Certified seed grower for 1 to 3 acres of production. This seed is used for demonstrations with commercial growers. The few that survive this stage and merit further evaluation are submitted to the Uihlein Foundation Seed Farm using the pathogen tested in vitro plants.

NORTH CAROLINA

F. L. Haynes

Breeding Program

In the tetraploid breeding program conducted at the Mountain Research Station, Waynesville, severe losses were incurred due to drouth and high temperatures. The hybridization program failed and clonal maintenance produced about 30 percent of the normal tuber yield. No irrigation was available.

Advanced trials of selections from North Carolina, USDA, and from other states were conducted at five coastal locations. Results of three of these are presented in North Carolina Tables 1, 2, and 3. Two trials are not included because severe drouth made the results of questionable value. In the coastal area the best early maturing clone was ND860-2. It was superior in both yield and chip color. Among the medium early to midseason clones B9792-158, NY71 and NY81 were outstanding across locations in yield and chip quality. The new cultivar Sunrise continued to produce good yields.

A trial was also conducted at one mountain location. Irrigation was applied to this trial. The results are presented in North Carolina Table 4. NY81 performed well at this location as it did on the coast.

Adaptation and Diploid Breeding

Evaluation of the adapted diploid PHU-STN population was continued at the Fletcher Station. 600 clones representing selections for high dry matter, early blight resistance, soft rot resistance and heat tolerance were maintained.

The study was continued to evaluate recurrent selection for maintaining a population and increasing tuber dry matter. A seedling nursery was planted representing the best clone in each of 72 families from 1985. Seeds produced will be planted to a second cycle of segregating progeny in 1987.

The studies of resistance to early blight at both the diploid and tetraploid levels were continued. 4X hybrids with high levels of resistance are being backcrossed to commercial cultivars.

Diploid clones with high levels of resistance to tuber soft rot and blackleg are being used in the hybridization program to produce 4X progeny. Diploids producing 2n pollen have been identified and cross readily with commercial cultivars.

North Carolina Table 1.

Potato trial at Bright Farm, Pasquotank County. Plots were 1 row, 24 ft. long, 4 replications of 24 entries in RCB, 32 hills/plot. Spacing in rows, 9 inches, 40 inch rows. Fertilized 2000 lb/A 10-10-10 banded. Planted 3/13/86, harvested 6/24/86 (102 days).

Variety	US#1-A CWT./A	PCT	Appearance ^{1/}	Chip ^{2/} Color	Specific Gravity	Maturity
B9947-N24	385.2	94.9	6.5	5.7	1.075	Midseason
Neb. La 138	360.1	96.4	7.5	3.7	77	Midseason
Atlantic	329.4	94.4	7.2	5.0	89	Midseason
81C1-7	328.1	92.9	7.7	3.0	75	Med. early
76C29-7	311.0	96.2	7.0	2.3	77	Med. early
Punao	300.8	95.4	6.5	4.3	76	Midseason
77C15-2	300.0	91.6	7.0	3.0	80	Midseason
Sunrise	294.7	93.4	7.7	4.7	71	Med. early
Langlade	291.3	93.1	8.0	4.7	67	Midseason
Norchip	288.6	90.0	7.0	4.0	84	Med. early
80C45-10	286.5	94.6	8.0	4.0	78	Midseason
81C1-8	270.2	92.7	7.7	2.0	83	Med. early
79C28-1	269.5	91.2	8.0	6.3	74	Midseason
76C18-5	262.0	90.2	6.7	3.7	73	Midseason
80C38-7	257.3	92.5	7.2	2.7	81	Med. early
Nemarus	254.6	94.6	7.7	3.7	-	Midseason
Superior	234.1	93.8	8.0	4.0	82	Early
73C26-1	226.6	88.7	8.0	4.7	79	Med. early
80C40-30	226.0	83.4	7.2	3.3	80	Med. early
81C1-4	218.5	88.8	7.5	3.3	80	Med. early
81C3-5	208.3	86.4	7.2	4.3	84	Med. early
81C4-2	203.5	90.6	7.7	2.3	75	Early
80C40-15	163.3	78.7	6.5	4.0	78	Midseason
81C3-2	94.6	77.0	6.0	7.0	76	Midseason
LSD (.05)	41.6	3.6	0.6			
CV (PCT)	11.1	2.8	5.7			

^{1/}Appearance: 1 = Very Poor; 3 = Poor; 5 = Fair; 7 = Good; 9 = Excellent.

^{2/}Chin color determined by Wise Foods. Borden. Inc., Berwick, PA. 1-4 acceptable with grade 1 = perfect; 5 useable but not desirable; 6-14 unacceptable with 14 = black.

North Carolina Table 2.

Potato trial at Cooper Farm, Tyrrell County. Plots were 1 row, 24 ft. long, 4 replications of 28 entries in RCB, 32 hills/plot. Spacing in row, 9 inches, width row, 38 inches. Fertilized 1000 lb/A 24-16-16, broadcast. Planted 3/12/86, harvested 6/25/86 (104 days).

Variety	US#1-A CWT./A	PCT	Appearance ^{1/}	Chip ^{2/} Color	Specific Gravity	Maturity
NY81	340.3	95.9	8.2	4.0	1.075	Med. early
NY71	333.2	93.9	7.2	3.0	78	Midseason
B9792-158	333.2	88.6	7.0	3.0	82	Midseason
Pungo	328.2	88.3	7.0	3.0	81	Midseason
Atlantic	315.3	91.6	7.5	2.7	89	Midseason
Langlade	311.7	90.9	6.7	2.3	73	Med. late
Sunrise	309.5	91.8	8.0	2.7	80	Med. early
ND860-2	306.7	89.0	8.0	2.0	86	Early
80C45-10	304.5	92.4	7.7	3.7	88	Med. early
Nemarus	300.2	85.1	8.0	4.0	79	Midseason
Neb. AB-1	295.9	90.3	7.5	3.7	90	Med. early
MS700-83	294.5	91.8	8.0	2.7	80	Early
NY82	290.9	89.2	7.0	2.7	78	Late
Superior	287.3	91.9	8.0	5.0	84	Early
NY72	287.3	90.3	7.0	3.0	75	Midseason
73C26-1	287.3	88.5	8.0	2.7	85	Early
B9979-132	280.9	88.1	8.0	2.7	82	Midseason
B9792-61	270.8	91.1	7.2	2.3	77	Med. early
Norchip	265.8	83.3	7.0	3.0	85	Med. early
B9423-4	265.8	82.3	7.0	2.7	78	Early
NY76	265.1	85.2	8.0	3.3	75	Early
B9792-136	239.3	85.8	7.5	2.3	84	Midseason
B9955-11	235.7	87.6	7.0	3.7	92	Early
B9955-28	233.6	86.1	8.0	4.0	70	Early
B9955-33	223.5	90.9	7.2	2.3	85	Early
80C40-30	218.5	76.3	7.0	3.7	85	Med. Early
80C40-15	197.0	74.0	7.2	2.7	81	Early
B9792-1B	193.5	85.6	7.7	2.0	80	Early
LSD (.05)	34.1	3.8	0.5			
CV (PCT)	8.7	3.0	4.3			

^{1/}Appearance: 1 = Very Poor; 3 = Poor; 5 = Fair; 7 = Good; 9 = Excellent.

^{2/}Chip color determined by Wise Foods, Borden, Inc., Berwick, PA. 1-4 acceptable with grade 1 = perfect; 5 useable but not desirable; 6-14 unacceptable with 14 = black.

North Carolina Table 3.

Potato trial at Davis Farm, Tyrrell County. Plots were 1 row, 24 ft. long, 4 replications of 28 entries in RCB, 32 hills/plot. Spacing in row, 9 inches. Width row, 38 inches. Fertilized 1500 lbs/A 15-10-10. Planted 3/12/86, harvested 6/26/86 (106 days).

Variety	US#1-A		Appearance ^{1/}	Chip ^{2/} Color	Specific Gravity	Maturity
	CWT./A	PCT				
NY81	457.8	97.3	7.7	3.7	1.075	Midseason
B9792-158	434.2	91.9	7.0	3.0	73	Midseason
Atlantic	400.5	95.0	7.5	3.7	86	Midseason
B9792-149	396.2	92.3	7.0	3.0	80	Med. late
NY76	380.5	93.5	7.0	2.3	69	Midseason
Nemarus	377.6	89.6	8.2	4.3	70	Midseason
80C45-10	371.9	87.6	8.0	3.7	75	Med. early
Langlade	369.7	93.0	7.2	2.7	68	Med. late
Neb. AB-1	366.8	92.6	7.2	3.7	75	Midseason
NY71	364.7	93.5	7.0	3.7	69	Midseason
NY82	361.1	91.6	7.2	2.0	70	Med. late
Pungo	355.4	82.7	6.7	3.3	70	Midseason
MS700-83	346.8	92.7	8.0	3.7	70	Midseason
ND860-2	342.5	92.0	8.0	2.7	77	Early
Sunrise	333.2	92.4	7.7	3.0	66	Med. early
B9792-136	327.4	91.5	7.0	3.0	79	Midseason
NY72	320.3	93.1	7.0	4.7	72	Midseason
Norchip	318.8	89.1	7.0	3.0	75	Med. early
B9792-61	317.4	93.7	7.5	2.7	80	Med. early
73C26-1	315.3	92.6	7.7	4.0	75	Early
B9792-132	298.8	89.3	7.0	2.3	78	Med. early
Superior	288.7	93.9	7.5	3.7	75	Early
80C40-30	287.3	86.1	7.2	2.3	75	Early
B9955-28	265.1	91.1	8.2	3.3	69	Med. early
80C40-15	255.8	84.0	7.2	4.0	73	Med. early
B9955-11	247.9	86.5	7.0	2.3	83	Med. early
B9955-33	235.7	90.7	8.0	2.3	80	Med. early
B9792-13	220.7	89.3	7.0	2.0	77	Med. early
LSD (.05)	56.1	4.1	0.5			
CV (PCT)	11.9	3.2	4.9			

^{1/}Appearance: 1 = Very Poor; 3 = Poor; 5 = Fair; 7 = Good; 9 = Excellent.

^{2/}Chip color determined by Wise Foods, Borden, Inc., Berwick, PA. 1-4 acceptable with grade 1 = perfect; 5 useable but not desirable; 6-14 unacceptable with 14 = black.

North Carolina Table 4.

Potato trial at Mountain Horticultural Crops Research and Extension Center, Fletcher, NC. Plots were 1 row, 24 ft. long, 4 replications of 20 entries in RCB, 32 hills/plot. Spacing in row, 9 inches. Width row, 42 inches. Fertilized 1250 lb/A 10-10-10. Planted 4/17/86, harvested 8/27/86 (131 days).

Variety	US No. 1-A		Appearance ^{1/}	Specific Gravity	AGTR ^{2/}	Maturity
	CWT/A	PCT				
NY 72	543.9	96.2	7.7	1.073	51.7	Midseason
Neb. La138	542.6	96.1	7.7	63	51.6	Med. early
Belchip	536.1	96.9	7.0	69	55.3	Late
NY 81	535.5	98.2	8.0	66	50.3	Med. early
Atlantic	532.9	97.0	7.7	72	49.6	Midseason
Katahdin	531.6	97.6	8.0	55	52.0	Late
Langlade	518.6	93.6	7.7	60	52.6	Med. late
NY 76	514.1	90.4	8.0	55	54.1	Med. early
MS700-83	456.4	93.6	8.0	64	56.6	Early
Pungo	455.1	92.6	6.2	58	55.3	Midseason
Sunrise	422.7	92.0	8.0	60	52.4	Med. early
Neb. AB-1	422.0	96.8	8.0	64	53.6	Early
Superior	412.9	97.9	7.7	62	52.8	Early
NY82	397.4	95.6	8.0	64	55.9	Med. late
NY71	394.8	97.0	7.7	61	57.8	Early
ND651-9	387.7	93.4	8.0	59	55.6	Early
Norchip	381.8	91.0	7.0	65	51.9	Med. early
ND860-2	365.0	94.3	7.7	68	57.5	Early
Viking	344.9	94.0	7.0	57	50.4	Med. early
Nemarus	309.9	91.8	7.2	67	46.3	Med. early
LSD (.05)	65.7	2.5	0.5			
CV (PCT)	10.3	1.9	5.0			

^{1/}Appearance: 1 = Very Poor; 3 = Poor; 5 = Fair; 7 = Good; 9 = Excellent.

^{2/}Agtron reading of chip samples.

NORTH DAKOTA

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Potato Breeding Program

Crossing and Seedling Production. In 1986, 214 potato crosses were made in the greenhouse. Approximately 61,000 seedlings were planted in the greenhouse during the summer and 57,810 seedling tubers were planted in the field at the Langdon Experiment Station. Approximately 1,400 seedling hills were saved for further evaluation and study. The seedlings were planted at Langdon on May 13, 14, and 15 and harvested on September 8, 9 and 10th.

Advanced Selections. One thousand and thirty-six second year selections were planted at Grand Forks for adaptability and evaluation and at Absaraka for seed increase. From this population, 224 were saved for future increase and testing. Three hundred forty-eight third and fourth year selections were planted at Casselton and Grand Forks and one hundred and forty-four were saved at harvest. Selections from Idaho, Texas and other states were also planted in increase and adaptability trials. The Grand Forks plot was planted on May 20th and 21st and harvested on September 4th and 5th. The Casselton plot was planted on May 28th and 29th and harvested on October 6th, 7th and 8th. Heavy rainfalls during late September and early October delayed harvest. It probably was one of the wettest falls on record. Spring rains also delayed planting.

Promising Selection. The most promising selection is ND534-4Russ which will be named sometime in 1987. This past season over 700 acres of certified seed of ND534-4Russ was grown in North Dakota and approximately 300 acres in Wisconsin. Certified seed was also produced in Michigan, Minnesota and Nebraska. In North Dakota seed of most of the ND534-4Russ was sold early in the season and at a good price. Line ND860-2 continues to look good as a chip cultivar. This selection chips out of 37-43°F, however tests have shown it not to be a long storage chipper. It will probably chip up to early March at cold temperatures. Approximately 200 acres of certified seed of this selection was grown in North Dakota during 1986.

Other promising selections that are being increased are NDT9-1068-11R, ND651-9, ND1215-1, ND671-4Russ. Line NDT9-1068-11R is a high yielding bright red selection, while ND651-9 and ND1215-1 are potential chipping selections. Line ND671-4Russ is an early russet that seems to be adapted for french fries. Another russet selection, ND1538-1Russ looked good in trial and also looked good as far as hollow heart susceptibility. This selection will be increased next season.

Cultivar and Selection Trials. Trials in 1986 were again planted at Grand Forks, Park River, Minot, Williston and Karlsruhe (North Dakota Table 1). The trial again consisted of 25 hills grown in four replicated blocks. There were 25 entries grown at Grand Forks and Park River (North Dakota Table 2). At Minot and Williston there were 12 entries and at Karlsruhe there were seven (North Dakota Table 3). The general maintenance of the trial at Park River was under the supervision of Wayne Grinde, while at Grand Forks, Roger Hansen maintained the plots. The other trials were conducted by personnel from the branch stations located at Minot, Karlsruhe and Williston.

The North Central Regional Trial was again planted at Grand Forks along with a selection and cultivar screening trial. Data from the North Central Trial will be in a separate report while data from the selection and cultivar screening trial is reported in North Dakota Table 4.

At both Park River and Grand Forks, growing conditions were quite ideal during the 1986 season. At Grand Forks in June there was 2.60", July 5.50" and August 1.56" of precipitation. Temperatures averaged about 66°F during those three months. At harvest time in mid-September it was very wet at both Grand Forks and Park River and this delayed harvest. This also resulted in a high incidence of hollow heart, especially at Grand Forks.

There was also plenty of precipitation in western North Dakota. At Williston there was a total of 18 inches of precipitation from April to September, however because of flooding and the trial being planted too late, yields were low. Flooding from runoff water reduced yield in two of the replications at Minot. Rainfall from May 1 to August 31 totaled 7.5 inches of which four inches fell from June 30 to July 1. It was dry early and late in the season at Minot, however, the heavy precipitation at a critical time during mid-season resulted in good yields.

The Park River trial outyielded the Grand Forks trial. The average of all entries at Park River was 252 cwt per acre compared to Grand Forks with 196 cwt per acre. Yields again were quite high at Minot and low again at Williston. This was a similar situation in 1985 when it was too dry at Williston, however in 1986 it was too wet which resulted in much flooding and low yields.

The highest yielding entry in the trials was NDT9-1068-11R with an average of 319 cwt per acre. The next highest yielding entries were ND1215-1 and ND534-4Russ. ND651-9, a good chipping selection, also produced good yield in the trials. ND671-4Russ yielded somewhat higher than Norgold Russet, NorKing Russet and Russet Burbank. Super Norgold

Russet yielded an average of 43 cwt per acre more than regular Norgold Russet. Red Pontiac and Kennebec, two high yielding cultivars, did not produce yields as high as in past years. This is unusual as both are normally very high yielding cultivars, especially Red Pontiac.

Line ND860-2 did not yield well in the 1986 trials as the vines matured and went down early in the season. Early blight and not enough fertilizer probably contributed to its early dying. ND860-2 has to be kept green for a longer period of time. ND1859-3, a yellow fleshed selection also yielded quite well.

In the advanced selection trial, ND2109-7, La 01-38 and ND1538-1Russ were the top yielders. La01-38 is an excellent selection from the Louisiana State University program and this selection no doubt will be named in the near future or as soon as a seed supply can be built up. ND2109-7 is a white-skinned chipper while ND1538-1Russ is a russet skin selection that shows a lot of promise. It is medium to medium-late in maturity. Krantz, a new russet cultivar, produced only fair yield, being much lower in yield than Norgold Russet.

At Grand Forks and Park River, the selections and cultivars with the highest total solids were ND398-1 (21.9%), TND22-2 (21.8%), Norchip (21.5%), ND1859-3 (21.4%) and ND1215-16 (21.4%). These total solids percentages can be considered high as the averages for all entries was approximately 20%. In the advanced selection trial ND2051-1Russ with 22.2% total solids was the highest in trial.

Processing Tests - Chipping. North Dakota Table 5 shows the Agtron reading for chip color and percent chip yield of selections and varieties grown in state-wide trials in 1985. Potato tuber samples were stored at 38°F right after harvesting and grading and then chipped out of storage at 38°F and then after two and four weeks of reconditioning at 60°F out of 38°F storage. Line ND860-2 was far superior in chip color than any other entries. Other selections showing excellent chip color after reconditioning were TND22-2, ND398-1, ND651-9, ND1118-1 and ND1215-1. Lines ND698-1 and ND1925-4 produced very white chips after reconditioning for 4 weeks.

Two hundred and twelve second year selections were tested for chip quality by the Research laboratory at East Grand Forks, Minnesota. These samples were first placed in cold storage and then reconditioned at 65°F prior to chipping. Two hundred samples which consisted of third year and older selections and cultivars were chipped out of 43°F storage and then reconditioned at 65°F prior to chipping. Several progenies from the parent ND860-2 or related breeding

material chipped quite good out of 43°F. Several selections chipped as good or better than the check cultivar, Norchip, after reconditioning.

Processing Tests - French Fry and Flake Tests

Sixteen french fry samples and ten flake samples were tested for color, texture and flavor by the Food and Nutrition Department at NDSU (North Dakota Table 6). The Russet Burbank commercial french fry scored the highest points for french fries. The next highest were the selections ND651-9 and ND860-2. The regular Russet Burbank sample from the Grand Forks plot did not show excellent french fry color. Line ND534-4Russ was similar in quality to the Russet Burbank check cultivar while NorKing Russet and ND671-4Russ had better french fry quality than Russet Burbank. French fry length was also determined on all samples. They were scored as extra long, long, medium and short.

In the flake test, the commercial Norchip sample scored the highest points. Again, ND651-9 and ND860-2 scored the next highest points followed by ND698-1 and the regular Norchip check flake cultivar.

Culinary Tests. Boiling and baking tests for cultivars and selections grown in the 1985 potato trials are found in North Dakota Table 7. NDT9-1068-11R was similar to Red Pontiac in the baking and boiling test. The high total solid entries were usually dry and mealy when baked or boiled. NorKing Russet continued to be a good dry, mealy baking potato.

Disease Control and Resistance Studies: Approximately 1600 second year and older breeding selections were evaluated for disease and resistance to scab and silver scurf at the Potato Research Farm, Grand Forks. We grew 1037 second year selections in an isolated area (Absaraka) and evaluated them for disease and horticultural characters. We grew 310 advanced selections in an isolated area (Casselton) and evaluated these for disease and disease reactions. Selections from these two areas, including 250 parents, 257 for maintenance, and 37 superior selections for basic seed increase, were glasshouse grown and visually indexed for tuber-borne diseases. These selections were also indexed for PVX and PVY using ELISA serological tests, and spindle tuber viroid using complementary DNA hybridization (dot-blot) tests. Representative "B" size tubers of these selections were also grown in Florida during the winter for disease indexing, particularly for virus diseases. Based on all indexing tests, the following numbers of virus infected plants were found: PSTV 7, PVX 0, PVY 5, PLRV 1 and purple top 2. The disease free selections were maintained as source of clean seed for breeding and other seed purposes. Thirty-seven second year selections were indexed for disease

and released top growers in Beach, ND as part of a basic seedstock program for rapid increase. The selections sent to Beach in 1986 were: 397-33, 460-12, 986-7, 1196-2R, 1433-11, 1444-11, 1449-2, 1513-3, 1564-4Russ, 1604-6, 1618-1R, 1667-6, 1990-5R, 2002-11R, 2013-15, 2013-22, 2016-17, 2042-6, 2061-15Russ, 2062-26, 2134-1R, 2134-5R, 2257-3, 2264-7, 2264-10, 2270-1R, 2285-5, 2302-2R, 2309-7, 2316-6, 2322-2Russ, 2335-5R, 2340-1, 2354-20R, 2358-13Russ.

Eight advanced selections were evaluated for bacterial ring rot (BRR) disease reactions. Twenty-four seed pieces per selection were inoculated and planted in the field at Prosper, ND and foliar and tuber symptoms evaluated. Typical foliar symptoms of BRR were displayed 87 days after planting by the following selections: NDT22-2, ND1892-2R, ND1538-1Russ, ND1859-3, and ND1871-3R. Typical foliar symptoms of BRR were displayed 95 days after planting by the following selections: 2126 (P), NDT9-1068-11R and ND1562-4R. All selections tested displayed typical tuber symptoms of periderm cracking and internal vascular discoloration.

Germplasm Evaluation - 4x x 2x Yield Trial. A yield trial containing 73 entries was conducted at two North Dakota locations; Absaraka and Grand Forks. At each location, 2 replications with 4 hills/rep were planted. The yield trial was planted on May 21 at Grand Forks and May 22 at Absaraka; vines were killed on September 8 at both locations. Entries included the cultivars Norchip, Red Norland and Norgold Russet and 4x hybrid clones from 4x x 2x crosses. The 4x parents of these hybrids were cultivars or advanced selections; the 2x parents were derived from crosses between Solanum tuberosum haploids and S. tuberosum Group Phureja, S. tarijense, or S. microdontum. Plots were scored for maturity on August 21 at Grand Forks and August 25 at Absaraka, using a scale of 1 (early) to 5 (late). Entries were also evaluated for yield, specific gravity and tuber number. Characteristics of the 27 highest-yielding entries, along with the cultivars are listed in Table 8. These entries produced yields similar to or above the cultivars. Maturity scores were generally medium-early. High levels of total solids were common, especially among hybrids containing S. tarijense. Tuber set was highest among hybrids containing Phureja and lowest among the cultivars. Tuber type was very good in several of the hybrids.

North Dakota Table 1. Spacing, fertilizer, soil type, planting and harvest dates of the 1986 trials.

Location	Spacing		Fertilizer	Soil Types	Planting Date	Harvest Date
	Row (in.)	Plant (in.)				
Park River	38	12	Fall application	Glyndon silt loam	5/13	9/11
Grand Forks	38	12	20-20-12 @ 300 lbs/acre	Bearden clay loam	5/20	9/29
Williston	36	16	None; planted on fallow	Loam	5/27	10/16
Minot	36	14	90-0-0 @ 350 lbs/acre	Williams Loam	5/14	9/17
Karlsruhe	36	14	78-45-45 @ 250 lbs/acre	Clontarf sandy loam	5/17	10/1

North Dakota Table 2. U.S. No. 1 yield, percent U.S. No. 1 and percent total solids of potato cultivars and selections grown in the Red River Valley, 1986.

Cultivar or Selection	Grand Forks				Park River				Average			
	Cwt/A		%		Cwt/A		%		Cwt/A		%	
	U.S. No. 1 Yield	% U.S. No. 1	Total Solids	% Total Solids	U.S. No. 1 Yield	% U.S. No. 1	Total Solids	% Total Solids	U.S. No. 1 Yield	% U.S. No. 1	Total Solids	% Total Solids
NDT9-1068-11R	258	91	20.3	18.8	379	88	18.8	19.6	319	90	19.6	19.6
ND1215-1	262	91	20.9	20.5	284	87	20.5	20.7	273	89	20.7	20.7
ND534-4Russ	220	90	19.0	20.7	301	89	20.7	19.9	261	90	19.9	19.9
TND22-2	212	91	22.2	21.4	298	88	21.4	21.8	255	90	21.8	21.8
ND1562-4R	286	78	18.0	17.7	308	84	17.7	17.9	247	81	17.9	17.9
Super Norgold Russet	210	82	20.5	20.1	281	79	20.1	20.3	246	81	20.3	20.3
ND651-9	197	77	21.8	21.2	290	83	21.2	21.5	244	80	21.5	21.5
ND791-5R	249	88	19.2	18.2	236	78	18.2	18.7	243	83	18.7	18.7
ND398-1	217	92	22.4	21.4	253	81	21.4	21.9	235	87	21.9	21.9
ND1871-3R	191	89	20.3	19.2	278	77	19.2	19.8	235	83	19.8	19.8
ND1113-10Russ	200	81	18.8	19.0	267	76	19.0	18.9	234	79	18.9	18.9
ND1859-3	229	95	22.2	20.5	231	85	20.5	21.4	230	90	21.4	21.4
Redsen	175	83	20.5	18.8	277	87	18.8	19.7	226	85	19.7	19.7
ND1196-2R	191	86	19.0	18.4	258	83	18.4	18.7	225	85	18.7	18.7
Kennebec	213	74	20.9	19.7	223	66	19.7	20.3	218	70	20.3	20.3
Norchip	177	84	21.8	21.2	247	68	21.2	21.5	212	76	21.5	21.5
ND1892-2R	194	82	19.7	18.8	226	66	18.8	19.3	210	74	19.3	19.3
ND671-4Russ	176	85	19.9	18.4	233	85	18.4	19.2	205	85	19.2	19.2
Red Pontiac	181	87	19.4	18.4	226	80	18.4	18.9	204	84	18.9	18.9
Norgold Russet	192	84	18.6	20.1	214	73	20.1	19.4	203	79	19.4	19.4
NorKing Russet	141	75	21.6	19.4	242	87	19.4	20.5	192	81	20.5	20.5
Red Norland	149	86	18.8	18.2	229	85	18.2	18.5	189	86	18.5	18.5
ND1215-16	150	84	22.0	20.7	214	71	20.7	21.4	182	78	21.4	21.4
Russet Burbank	187	80	21.4	20.9	156	54	20.9	21.2	172	67	21.2	21.2
ND860-2	133	85	21.8	20.7	158	77	20.7	21.3	146	81	21.3	21.3
Average	196	85	20.4	19.7	252	79	19.7	20.1	224	82	20.1	20.1

North Dakota Table 3. Yield Data and Total Solids of Potato Cultivars Grown at Minot, Williston and Karlsruhe, ND - 1986^{1/}

Cultivar or Selection	Minot			Williston	
	Cwt/A	Percent	Percent Total	Cwt/A	Percent
	U.S. No.1 Yield			U.S. No. 1 Yield	
		U.S.No.1	Solids		U.S.No.1
Kennebec	300	94	23.7	113	87
Norchip	292	91	24.2	109	80
Norgold Russet	202	84	21.6	74	78
NorKing Russet	248	89	22.0	68	71
Red Norland	207	89	19.9	72	76
Red Pontiac	323	94	20.1	97	83
Redsen	213	84	20.5	37	65
Russet Burbank	191	74	22.7	73	64
ND534-4Russ	247	90	21.4	62	69
ND651-9	251	85	22.2	70	72
ND671-4Russ	196	80	22.2	46	50
ND860-2	155	81	22.4	56	72
Average	235	86	21.9	73	72

Cultivar or Selection	Karlsruhe		
	Cwt/A	Percent	Percent Total
	U.S. No.1 Yield		
		U.S.No.1	Solids
Norgold Russet	285	92	20.7
Norland	277	94	18.8
NorKing Russet	238	92	22.0
Redsen	226	87	18.6
Red Pontiac	377	94	18.8
ND671-4Russ	274	87	19.7
ND860-2	233	90	20.9
Average	255	91	21.2

^{1/} Minot and Williston are dry land; Karlsruhe is irrigated.

North Dakota Table 4. Advanced Selection and Cultivar Trial Grown at Grand Forks, North Dakota - 1986.

Selection or Cultivar	U.S. No. 1	% U.S. No. 1	Specific Gravity	%
	Yield cwt/A			Total Solids
ND2109-7	257.8	92.7	1.089	21.6
La 01-38	253.1	94.5	1.089	21.6
ND2224-5R	252.0	88.8	1.073	18.2
ND1538-1Russ	245.3	88.8	1.086	20.9
ND2031-8	237.6	84.0	1.085	20.7
Redsen	235.4	89.3	1.079	19.4
ND2157-4	224.2	83.5	1.085	20.7
ND2191-5	222.4	75.0	1.089	21.6
ND2008-2	215.8	90.4	1.085	20.7
ND2087-7	210.3	80.8	1.084	20.5
ND2158-10	204.8	77.5	1.084	20.5
Norchip	204.4	81.8	1.090	21.8
ND1483-16R	200.6	83.1	1.077	19.0
ND1520-3Russ	196.5	88.7	1.074	18.4
Red Norland	194.1	83.7	1.078	19.2
Norgold Russet	187.9	71.1	1.079	19.4
ND2051-1Russ	187.9	73.9	1.092	22.2
ND2207-8Russ	185.2	78.3	1.079	19.4
ND2141-4Russ	184.8	87.8	1.073	18.2
ND2222-7	183.3	80.8	1.088	21.4
ND1378-4Russ	165.9	75.8	1.081	19.9
ND1183-2	164.6	84.1	1.089	21.6
ND1719-5Russ	157.1	87.7	1.079	19.4
ND698-1	155.4	90.6	1.084	20.5
Krantz	153.2	56.1	1.085	20.7
ND1682-2	141.9	80.8	1.085	20.7
ND1925-4	134.7	86.0	1.090	21.8
ND2165-8	125.9	70.5	1.084	20.5
<hr/>				
Average	195.8	82.4	1.080	20.4

North Dakota Table 5. 1986 Chip Tests (Agron Reading) of Cultivars and Selections Grown at Park River and Grand Forks in 1985.

Cultivar or Selection	0 weeks 38°F		2 weeks 60°F		4 weeks 60°F		Percent yield average 3 tests	
	Grand Forks	Park River	Grand Forks	Park River	Grand Forks	Park River	Grand Forks	Park River
Kennebec	7.5	13.0	16.0	22.5	23.0	30.5	30.0	30.8
Norchip	11.0	16.5	22.0	21.5	34.5	34.0	32.9	33.4
NorKing Russet	15.5	16.5	20.5	23.5	22.0	32.8	31.6	32.9
Norgold Russet	12.0	10.5	17.5	19.0	24.5	33.5	31.1	32.2
Super Norgold	11.0	8.5	17.0	16.5	21.0	30.0	30.2	30.6
Russet Burbank	9.5	13.0	25.0	17.5	22.0	33.8	33.1	33.9
AT9-77259B-8Russ	13.0	17.5	27.0	24.5	36.5	35.0	32.6	34.1
TND22-2	10.5	16.5	27.0	21.0	35.0	34.8	33.8	34.0
ND398-1	11.0	12.0	38.0	24.0	48.5	33.8	33.2	32.8
ND534-4Russ	10.0	10.5	15.0	20.0	23.0	31.5	30.5	31.0
ND671-4Russ	18.0	19.0	22.0	21.5	29.5	31.5	31.3	31.8
ND651-9	15.5	20.0	27.0	22.5	36.0	32.0	30.4	31.8
ND860-2	24.5	35.0	42.5	49.0	50.5	34.5	32.4	34.9
ND1113-10Russ	9.0	13.0	21.0	20.5	27.0	31.5	30.2	31.2
ND1118-1	11.5	17.0	21.5	24.5	41.0	32.8	28.8	31.0
ND1215-1	12.5	18.5	22.0	27.0	39.0	31.5	29.9	31.9
ND1323-1	12.0	10.0	20.5	29.5	39.5	30.5	28.8	30.3
ND698-1	30.0		49.0		57.0		32.7	
ND967-1Russ	12.0		15.0		17.0		29.7	
ND1183-2	18.0		31.0		44.0		34.8	
ND1215-16	15.0		22.0		36.0		31.8	
ND1696-8	21.0		16.0		30.0		33.0	
ND1859-3	15.0		24.0		16.0		31.8	
ND1925-4	22.0		48.0		55.0		33.2	
Average	14.5	15.7	25.3	23.8	33.6	32.6	31.6	32.3

North Dakota Table 6. Average Scores for French Fry and Flake Tests^{1/}.

Cultivar or Selection	French Fries					Flakes				
	Color	Texture	Flavor	Ave. Score	Ranking	Color	Texture	Flavor	Ave. Score	Ranking
Norchip ref.*										
Norchip										
Russ.Burbank ref.*	8.0	7.4	7.9	8.0	1	7.9	7.7	7.7	7.8	1
Russet Burbank	4.5	6.9	5.1	5.5	13	7.1	7.3	6.8	7.1	5
NorKing Russet	5.5	6.8	6.8	6.4	8					
Viking	2.5	5.8	2.4	3.6	16	7.1	5.4	6.8	6.4	7
AT9-77259B-8Russ	7.0	7.6	6.7	7.1	6					
ND394-1	6.8	7.0	6.6	7.1	7					
ND398-1						7.2	6.5	6.1	6.6	6
ND534-4Russ	3.8	5.6	4.5	4.6	14	6.5	5.7	5.5	5.9	10
ND651-9	8.2	8.1	7.3	7.9	2	8.0	7.1	7.4	7.5	2
ND671-4Russ	5.7	6.4	6.4	6.2	9	6.5	5.6	6.2	6.1	8
ND698-1						7.4	7.1	7.0	7.2	4
ND860-2	8.1	7.5	6.6	7.4	3	8.0	7.0	7.4	7.5	3
ND1113-10Russ	5.4	6.3	6.1	5.9	11					
ND1215-1	7.7	7.2	7.1	7.3	5	6.2	5.7	6.4	6.1	9
ND1378-4Russ	6.3	6.1	6.3	6.2	10					
ND1684-2	8.2	7.5	6.5	7.4	4					
ND1719-5Russ	3.2	5.3	3.4	4.0	15					
ND1960-1Russ	4.8	6.9	5.2	5.6	12					

*Commercial package

Rating Guide

- 7-9 — Good
 5-6 — Fair, but acceptable
 1-4 — Poor, not acceptable

^{1/} All french fries and flakes were tested three times, except Russet Burbank and Norchip reference which were tested 9 times for french fries and Norchip reference which was tested 6 times for flakes.

North Dakota Table 7. 1986 Cooking Tests of Cultivars and Selections Grown at Grand Forks and Park River, North Dakota - 1985^{1/}

Cultivar or Selection	Boiling									
	Sloughing ^{2/}	Mealiness ^{3/}	Color		After Cooking ^{4/}	Color After Cooking ^{5/}	Flavor ^{6/}	Baking		
			After Cooking	4 Hours				Mealiness	Color	Flavor
ND1323-1	8.8	6.6	8.0	8.0	8.0	6.9	6.5	8.5	6.6	
ND398-1	7.0	8.8	9.2	9.8	9.8	7.2	8.4	8.5	6.3	
ND671-4Russ	8.5	7.1	8.0	8.0	8.0	7.5	8.1	9.0	7.5	
Kennebec	9.3	6.9	7.8	9.3	9.3	7.6	7.4	8.8	7.3	
ND1215-1	9.3	6.4	8.5	8.5	8.5	6.8	5.6	8.5	6.9	
AT9-77259B-8Russ	8.0	8.3	9.3	9.0	9.0	7.8	8.0	9.0	6.8	
Norgold Russet	9.3	7.2	10.0	8.2	8.2	7.3	8.3	9.8	7.4	
ND649-4R	9.8	6.0	9.0	8.0	8.0	8.0	6.0	10.0	7.5	
ND1196-2R	9.8	5.5	9.5	9.8	9.8	6.8	5.9	9.5	7.0	
ND534-4Russ	8.3	8.3	6.5	8.3	8.3	7.9	7.9	8.5	7.3	
ND372-2R	9.3	6.8	10.0	7.5	7.5	7.4	6.5	9.5	7.0	
NDT9-1068-11R	9.8	5.0	9.3	8.5	8.5	7.3	4.4	9.3	7.1	
Russet Burbank	8.5	8.8	7.5	9.3	9.3	7.5	7.9	8.3	7.5	
ND1118-1	8.8	6.8	8.5	8.5	8.5	7.5	5.4	8.8	6.9	
Redsen	8.5	6.5	7.8	7.3	7.3	7.3	6.4	9.5	7.0	
Red Norland	10.0	5.6	8.8	8.5	8.5	7.0	5.5	9.8	6.6	
Super Norgold	9.0	7.3	9.0	9.3	9.3	8.3	7.1	10.0	7.8	
ND651-9	9.3	7.0	9.3	8.0	8.0	7.6	6.8	9.8	6.8	
Norchip	8.5	7.6	7.8	7.8	7.8	7.4	7.5	8.8	7.6	
Red Pontiac	9.3	6.4	7.8	9.3	9.3	7.6	6.4	8.8	6.6	
TND22-2	5.0	7.5	8.5	8.3	8.3	7.9	7.8	9.5	7.1	
ND791-5R	10.0	6.0	8.8	7.8	7.8	7.5	3.8	9.0	6.9	
ND1113-10Russ	9.5	7.8	9.0	9.3	9.3	7.9	7.4	9.5	7.0	
ND860-2	8.3	8.6	9.5	6.5	6.5	8.0	7.8	10.0	7.1	
NorKing Russet	7.8	8.1	9.3	8.3	8.3	8.0	8.1	9.3	7.6	

1/ Average of two locations (Grand Forks and Park River)

2/ Severe Sloughing - 1; No Sloughing - 10

3/ Not Mealy - 1; Very Dry and Mealy - 10

4/ Dark - 1; Very White - 10

5/ Dark - 1; Very White - 10

6/ Poor Flavor - 1; Excellent Flavor - 10

North Dakota Table 8. Yield, maturity, specific gravity and tuber number of 4x x 2x hybrids and check cultivars, averaged across locations and reps.

Clone	Exotic Parent of 2X	Yield (lb/hill)	Maturity*	% Total Solids	Tuber No./ 4 hills
S436	<u>S. tarijense</u>	2.8	3.0	21.8	6
DT062	Phureja	2.8	3.3	22.0	10
DT060	Phureja	2.7	2.8	23.5	8
DT05	Phureja	2.7	2.8	22.2	11
DT021	Phureja	2.6	2.8	18.8	9
DT06	Phureja	2.6	2.8	21.6	8
DT055	Phureja	2.6	3.0	23.5	10
DT019	Phureja	2.6	2.8	19.9	13
DT015	Phureja	2.6	3.3	21.6	5
DT016	Phureja	2.5	3.3	21.8	9
DT047	Phureja	2.5	2.8	20.7	7
DT028	Phureja	2.5	2.8	19.2	9
DT045	Phureja	2.5	3.3	23.1	9
DT030	Phureja	2.5	4.0	20.3	8
DT032	Phureja	2.5	3.0	16.9	9
DT040	Phureja	2.4	2.3	20.5	9
S486	<u>S. tarijense</u>	2.4	3.0	24.0	7
S452	<u>S. tarijense</u>	2.4	3.0	24.0	7
DT035	Phureja	2.3	2.8	21.4	7
DT069	Phureja	2.3	3.0	21.8	9
DT014	Phureja	2.3	3.0	22.4	9
DT067	Phureja	2.3	3.0	22.2	10
DT039	Phureja	2.3	3.5	22.0	9
S476	<u>S. tarijense</u>	2.2	3.0	23.3	9
S465	<u>S. tarijense</u>	2.2	3.0	22.9	7
DT029	Phureja	2.2	3.5	20.3	8
DT03	Phureja	2.2	2.3	20.5	11
Norchip	---	2.4	3.0	23.1	6
Red Norland	---	1.9	1.8	20.9	5
Norgold Russet	---	1.6	2.8	20.9	5

* Early-1; Late-5

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Introduction

Eight cultivars were planted in each of four farms. These farms were selected in order to give different soil and climate conditions. These cultivars were selected either because they looked promising in previous over-the-state trials or looked promising in the observation trials on two cooperating farms or were selected from the cultivar plots at the Ohio Agricultural Research and Development Center, Wooster. The Katahdin and Norchip cultivars were included as standard varieties.

In addition, the main cultivars were planted at the Campbell Institute for Research and Technology, Napoleon, Ohio, and at the Muck Crops Branch, OARDC, and Willard, Ohio. The data from these locations, along with results from the North Central Regional Potato Trial and the NE107 Regional Trial (Wooster) are available from M.A. Bennett.

On two of the four farms, 13 other entries were planted in replicated plots to find new selections for the main plots in 1987. Samples from breeders and seed growers, which could not be included in these two observation plots, were planted at the OARDC. This data will be included in the OARDC portion of this report.

STATEWIDE TRIALS

Farm Locations

The four farms referred to in the introduction are as follows:

Farm 2 (TH) - Thompson Farms, near Hanoverton, Ohio, Columbiana County -- Main plots plus observation plots.

Farm 3 (Mel) - Mellinger Farms (Crystal Springs Farm), near Leetonia, Ohio, Columbiana County -- Main plots plus observation plots.

Farm 4 (L) - Logan Farms, near Mt. Gilead, Ohio, Morrow County --Main plots.

Farm 5 (C) - Chase Farms, near Defiance, Ohio, Defiance County --Main plots. Harvest was delayed due to wet weather.

See Table 2 for summary of cultural practices followed on these cooperating farms -- planting dates, harvest dates, rainfall and related information

Procedures

The cultivars planted in the main plots in the four farms included: LA01-38, Elba (NY 59), MS 700-70, ND 534-4, Conestoga, WNC 521-12, and the standards - Norchip and Katahdin. The 13 cultivars in the observation plots are shown in Tables 7 and 8.

The plots on each farm were replicated, and data were taken from three replicates of each cultivar. Planting dates ranged from May 3 to May 9. The seed was collected, held in storage at OARDC, transferred prior to planting to Farm No. 2 where the seed was cut, counted, treated with mancozeb, and bagged for planting at the other sites. Following emergence, stand counts were made. During the growing season, observations were made on diseases, plant vigor, relative maturity, and any other unusual visual conditions.

The plots were harvested with level-bed diggers. A fifty-pound sample was taken from each replicate, graded to U.S. No. 1 standards, and out of this sample 10 tubers were cut for internal defects. A sample of each cultivar was collected at grading for the Pilot Plant, Department of Horticulture, OSU, where chipping and other quality tests were made. See Tables 5 and 8 .

Due to the heavy rains and unfavorable weather in the Defiance area, the only data collected on Farm No. 5 were the gross yields in the field at harvest.

Soil samples were taken on each of the cooperating farms and submitted to the REAL Laboratory, OARDC, for analysis. See Table 1.

Observations

Stands were good with an average 95% on three of the four farms. No stand counts were made on the fourth farm (No.5) due to weather conditions. Conditions were dry in May which may help to explain the excellent stands, probably best stands in the 24 years for these over-the-state plots. In the observation trials in the two farms, the average stand was 93.5%, with lowest 65% for G670-11.

Observations were made during the growing season for visual symptoms of the several virus diseases which can be observed by experienced inspectors. Mosaic was most common. In most entries, the mosaic was mild and/or latent mosaic. No visual symptoms of mosaic were found in the LA01-38 or Katahdin. MS 700-70, Norchip, and Elba showed mosaic in the 4 to 7% range. Seedsmen and breeders interested in more detailed information on the amount of the mosaic virus (by visual observation) should write to Mr. Floyd Lower, 373 East Chestnut Street, Lisbon, OH 44432.

Summary

On the basis of the data presented in this report, along with the observations made at harvest and also at time of grading the samples, perhaps the following comments may be helpful.

For a comparison with the various cultivars which have been included in the main (over-the-state) commercial farm trials, see Table 6. The data does not include the information from the two observation plots which were included each year.

Conestoga is a round to slightly oblong tuber with a light buff to slightly netted skin. Enlarged lenticels and growth cracks could be a problem on poorly drained soils. It is a promising cultivar for early, fresh market. Excellent cooking quality has been reported.

ND 534-4 is a promising russet-type potato under Ohio conditions. In the plots in 1986, the tubers were quite uniform with a trace of second growth. The tubers have attractive, medium to moderate russet skin, and shallow eyes. May need irrigation and higher fertilizer rates. Norchip was included as a standard variety. This cultivar was surprisingly attractive, which may be due to the excellent growing conditions. Growth cracks and second growth occurred in several plots.

LA01-38 continued to be among the most promising cultivars in the Ohio plots in 1986. The tubers are round to slightly oblong, medium buff skin, with a slight tendency for second growth. The cultivar has yielding ability and probably needs more testing under different soil/climatic conditions. Seed will not be available in 1987. Results in other states in this region indicate this cultivar has possibilities for fresh market and chipping.

MS 700-70 is one of the introductions from Michigan State University which has looked promising in earlier Ohio tests. It is a white skinned, round to slightly oblong tuber, with a slight tendency for growth cracks. In these plots, there was a wide range in tuber size. Preliminary reports indicate it may offer some possibilities for the chip industry.

WNC 521-12 will be dropped from the Ohio trials due to hollow heart problems, scab susceptibility, and possible metribuzin injury.

Elba (NY 59) has been a high-yielding cultivar in the Ohio trials, but due to the possible internal discoloration problem, this cultivar is not being suggested for mineral soils in Ohio. It is promising on organic soils. The tubers are round, with a slightly netted skin. The apical (bud) end tends to be deep under some growing conditions. The tubers are quite uniform with shallow eyes. The maturity is late.

Katahdin was included in these plots as a standard.

Table 1. Soil Analyses - 1986: Statewide Trials
Four Cooperating Farms*

	2 (TH)	3 (Mel)	4 (L)	5 (C)
pH	5.3	6.1	6.7	6.6
P (lbs/A)	550	550	74	506
K (lbs/A)	414	307	291	498
Ca (lbs/A)	1390	2470	4680	3960
Mg (lbs/A)	317	326	684	344
CEC (MEQ)	14	12	16	13
Ca % B.S.	25	54	73	75
Mg % B.S.	10	12	18	11
K % B.S.	3.9	3.4	2.3	4.8
Zn (lbs/A)	14.0	11.7	19.3	38.6
B (lbs/A)	.6	1.0	1.6	1.9
Mn (lbs/A)	71	88	32	49
O.M. (%)	1.7	2.1	4.0	2.8

* For code on farm identification, see text.

Soil analyses performed by REAL Laboratory, Ohio Agricultural
Research and Development Center, Wooster, OH

Table 2. Summary of Average Plant Stand, Yield of U.S. No. 1 tubers, and
Percent Culls and B-Size Tubers - 1986
Average of Three Statewide Farms

Cultivar	Average Standard	CWT/A U.S. No. 1	U.S. No. 1	Percent "B"	Percent Culls
LA01-38	93	413	95	2	3
Elba	94	393	94	3	3
MS700-70	97	378	92	3	5
Katahdin	97	363	92	4	4
WNC 521-12	90	344	91	2	8
Conestoga	94	321	89	4	7
ND 534-4	96	302	85	8	7
Norchip	97	301	84	6	10
Average	95	347	90	4	6

The relative material for these eight cultivars in 1986 follow:

Early - 115 to 121 days - Conestoga

Medium Early - 122 to 129 days - ND 534-4, LA01-38

Mid-Season - 130 to 135 days - Norchip, Katahdin

Late - 136 to 139 days - MS700-70, WNC 521-12

Very Late - 140 or more days - Elba

Table 3. Cultural and Pest Control Practices Used on Four Ohio Farms
Main Trials

	2 (TH)	3 (Mel)	4 (L)	5 (C)
Gross Yield (cwt/A)	329	413	209	563
Date Planted	May 3	May 6	May 8	May 9
Date Killed	Sept 8	Sept 10	Sept 4	Sept 10
Date Harvested	Oct 7*	Oct 2	Oct 9	Nov 12*
1985 Crop	Wheat	Wheat	Corn	Soybeans
Cover Crop	Clover & Timothy	Stubble	None	None
Fertilizer	30 lbs N 900 lbs 12-15-25	1100 lbs 10-20-20	140 lbs N 160 lbs P 160 lbs K 30 lbs S	Complete Broadcast Liquid in row 112 gl 5-15-15
Herbicide Incorporated Pre-emergence	Eptam Lorox & Dual	- Dual & Sencor	- Dual & Lorox	- -
Systemic Insecticide Spacing (inches)	Thimet 9x36	Thimet 10x34	Temik 10x36	Furadan 10x34
Soil type	Silt loam	Chili Silt loam	Heavy Silt loam	Bilmore loam
Soil condition	Good but slightly dry	Good but slightly dry	Good	Good but Slightly wet
Rainfall (inches)** (plant - vine kill)	17.7	11.7	18.23	24.0
Rainfall (inches) (Jun-Jul-Aug)	13.4	9.5	14.69	19.35

* Harvest delayed due to rain

** Includes one inch by irrigation

Table 4. Statewide Trials: Gross Yield, U.S. No. 1 Yield, Percent U.S. No. 1 - Four Farms, Ohio 1986 (CWT/A)

Cultivar	Farm 2 (TH)			Farm 3 (Mel)			Farm 4 (L)			Farm 5 (C)*			Average**	
	Gross Yield	U.S. No. 1	% U.S. No. 1	Gross Yield	U.S. No. 1	% U.S. No. 1	Gross Yield	U.S. No. 1	% U.S. No. 1	Gross Yield	U.S. No. 1	% U.S. No. 1	U.S. Yield	% U.S. No. 1
Conestoga	312	268	86	387	346	90	273	248	91	482	321	89	321	89
ND 534-4	319	254	80	431	384	89	311	268	86	627	302	85	302	85
LA 01-38	382	351	92	462	439	95	456	448	98	586	413	95	413	95
MS 700-70	338	296	87	449	421	94	448	418	93	533	378	92	378	92
Norchip	324	253	78	384	329	86	355	322	91	494	301	85	301	85
Katahdin	309	274	89	402	361	90	468	455	97	657	363	92	363	92
WNC 521-12	296	256	89	382	348	89	455	427	94	485	344	91	344	91
Elba	351	331	94	394	368	93	510	478	94	646	393	94	393	94
Average	329	285	88.5	413	374	91	410	383	93	563	347	90	347	90

*U.S. No. 1 yield are not available on this farm, due to weather conditions at harvest. Field weight is shown.

**U.S. No. 1 yield (CWT/A) three farm - Farm 2 (TH), Farm 3 (Mel), and Farm 4 (L)

Table 5. Summary of Chipping Quality - Three Farms - 1986

Cultivar	Farm #2 (TH)				Farm #3 (MEL)				Farm #4 (L)			
	Spec Gravity	PC/SFA Color	Blister %	Agtron E5 - F	Spec Gravity	PC/SFA Color	Blister %	Agtron E5 - F	Spec Gravity	PC/SFA Color	Blister %	Agtron E5 - F
Conestoga	1.073	1	0	54.3	1.075	1	0	59.2	1.074	2	0	50.9
ND 534-4	1.071	1	40	54.7	1.072	3	50	53.7	1.078	1	20	48.6
Norchip	1.070	2	20	49.0	1.077	1	0	53.3	1.082	2	40	55.2
LA01-38	1.085	1	30	50.0	1.092	2	30	57.8	1.088	1	10	48.9
Katahdin	1.072	2	10	51.3	1.073	1	30	51.0	1.068	3	0	43.3
MS 700-70	1.093	1	10	49.8	1.097	1	0	50.2	1.092	1	0	56.9
WNC 521-12	1.106	2	30	62.0	1.107	1	20	48.1	1.107	1	20	45.9
Elba (NY 59)	1.083	3	20	44.2	1.082	1	30	57.5	1.083	4	20	26.0

See text for farm symbols

Specific gravity and chipping tests made after harvest and prior to storage.

PC/SFA refers to fry color standards as established by the Potato Chip/Snack Food Association: 1.0 - lightest colored chip; 5.0 darkest color chip.

Table 6. Summary of Yields (U.S. No. 1) of Major Entries in Ohio Over-the-State Trials, 1977-1986

Cultivar	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Jemseg					207	294	163			
Superior	248	256								
Conestoga					254		141	230	266	321
Crystal	256	348	425	273						
Atlantic	374	309	414							
Langlade (W-718)	360	299	386	296	311	388				
Norchip	262	262	309	201	231	337	184	208	228	301
LA01-38									359	413
Katahdin	320	255	346	267	292	374	238	315	335	363
Denali				316	269	300	206			
Elba (NY 59)					324	373	245			393
NEB. A129.69-1				320	336	341	207	278		
WNC 521-12									325	344

Table 7. Observation Trials - Two Farms - 1986
Yield (CWT/A) of U.S. No. 1 Tubers and Percent U.S. No. 1

Cultivar	Farm 2 (TH)		Farm 3 (Mel)		Average	
	U.S. No. 1 Cwt/A	% U.S. No. 1	U.S. No. 1 Cwt/A	% U.S. No. 1	U.S. No. 1 Cwt/A	% U.S. No. 1
Atlantic	341	91	314	87	355	89
BRS991 WV16	339	90	369	93	354	92
Yukon Gold	273	90	363	92	318	91
Krantz	281	90	347	88	314	89
Wischip 19	284	92	342	94	313	93
Wischip 16	246	87	352	95	299	91
Campbell 14	261	88			292	90
Sunrise	240	94	322	91	281	93
Superior	236	86	321	87	279	87
ND860-2	238	85	294	88	266	87
G670-11	260	90	262	89	261	87
Norking R	215	83	302	88	259	86
Agassiz	178	80	286	89	232	85
average	261	88	322	90	292	88
Katahdin*	274	89	361	90	318	90
Norchip*	253	78	329	86	291	82

*Data from adjoining plots

Table 8. Observation Trials - Two Farms
Yield, Specific Gravity and Chipping data, 1986 (Yields - CWT/A)

Cultivar	FARM 2 (TH)					FARM 3 (Mel)				
	Yield U.S. No.	Specific Gravity	PC/SFA Color	% Blister	Agtron E5-F	Yield U.S. No.	Specific Gravity	PC/SFA Color	% Blister	Agtron E5-F
Atlantic	341	1.093	1	40	57.5	314	1.074	1	10	51.6
BR5991 WV16	339	1.087	1	20	54.2	369	1.096	2	20	49.4
Wischip 19	284	1.085	1	10	58.2	342	1.086	2	0	61.4
Krantz	281	1.072	1	20	58.2	347	1.100	2	30	52.2
Yukon Gold	273	1.078	3	10	52.8	363	1.079	2	10	50.7
Campbell 14	261	1.082	2	50	58.5	322	1.090	2	50	50.7
6670-11	260	1.097	2	20	56.4	262	1.099	1	0	48.0
Wischip 16	246	1.080	1	50	59.4	352	1.079	2	10	58.0
Sunrise	240	1.075	1	30	52.0	322	1.083	2	0	55.5
ND860-2	238	1.076	1	20	56.6	194	1.082	1	30	57.5
Superior	236	1.068	3	10	37.8	321	1.075	1	0	52.8
Norking R	215	1.084	1	40	44.4	302	1.079	1	10	52.1
Agassiz	178	-	-	-	-	286	1.074	1	30	52.0

Table 9. Yield, Grade, and Tuber Defects (percent hollow heart, internal discoloration, and vascular discoloration) for Observation Trial Entries, Wooster, OH - 1986.

Cultivar	CWT/A Gross	CWT/A US No 1	% US No 1	Tuber Defects		
				Hollow Heart	% Int. Disc.	Vasc. Disc.
MS 702-91	295	254	86	0	17	3
MS 700-70	263	231	88	0	30	0
MS 716-15	345	296	86	0	0	0
MS 702-80	304	255	84	0	0	0
WNC 672-2	271	249	92	0	20	0
AC 77513-1 Russ	142	117	82	0	0	0
WNC 567-1 Russ	162	118	73	0	3	0
A 76147-2	428	386	90	0	0	0
AC 77652-1	155	131	85	0	0	0
Krantz	53	52	98	0	0	0
MN 11816	160	138	86	0	0	0
BN 9820-3	145	121	83	0	0	0
CF 7688-9	346	311	90	0	0	0
AF 522-1	191	174	91	0	0	10
NY 64	385	323	84	0	0	10
AF 522-5	264	233	88	0	10	0
BC 9668-1	198	156	79	0	0	0
AC 79100-1	213	166	78	0	0	0
AC 79128-1	254	166	65	0	0	0
A 72685-2	274	257	94	0	0	0
CD 7916-3	126	115	91	0	0	0
MS 700-79	167	150	90	20	0	0
B 6949-WV3	165	125	76	0	10	0
W 752	312	281	90	0	0	0
WNC 285-18	119	95	80	0	0	0
MN 12331	254	216	85	0	0	0
MN 11705	274	242	88	0	0	0
MN 10874	254	227	89	0	30	0
B 9792-8B	363	322	89	0	0	0

Table 9. (continued) Yield, Grade, and Tuber Defects (percent hollow heart, internal discoloration, and vascular discoloration) for Observation Trial Entries, Wooster, OH - 1986.

Cultivar	CWT/A Gross	CWT/A US No 1	% US No 1	Tuber Defects		
				Hollow Heart	% Int. Disc.	Vasc. Disc.
CF 7523-1	395	313	79	0	0	0
BN 9803-1	230	184	80	10	0	0
BN 9855-2	334	273	82	0	0	0
ND 534-4	295	254	86	0	0	0
A 7411-2	232	170	73	0	0	0
CF 7679-15	293	247	84	0	0	0
MN 12465	264	243	92	0	0	0
AF 236-1	324	272	84	0	0	0
BR 5662-WV13	167	152	91	0	0	0
WNC 672-2	332	311	94	0	0	0
TC 582-1	104	89	86	0	0	0
AC 77652-1	249	186	75	10	0	0
NY 72	271	246	91	0	0	0
NY 71	276	226	82	0	0	0
W 779 Rus	407	327	80	0	0	0
Caribe	465	427	92	0	0	0
WIS 903	264	224	85	0	0	0
WIS 79-5	293	217	74	0	0	0
WIS 855	327	300	92	0	0	0
WIS 848	324	299	92	0	0	0
ND 1538-1 RUS	249	199	80	0	0	0
ND 1215-1	365	323	88	0	0	0
ND 698-1	208	178	86	0	0	0
ND 671-4 Rus	211	182	86	0	0	0
ND 651-9	315	250	79	0	0	0
ND 1113-10 Rus	346	297	86	0	0	0
Tolass (MN 7973)	312	274	88	0	0	0
NY 81	327	289	88	0	10	0
Kennebec	327	249	76	0	0	0

Table 10. Specific Gravity, Solids, and Chipping Characteristics for Observation Trial Entries, Wooster, OH - 1986

Cultivar	Specific Gravity Water	Average Total Solids %	Chip Color PC/SFA	% Blister	Agtron E-5F	Agtron M-30A
MS 702-91	1.084	21.06	3	40	58.0	46
MS 700-70	1.088	21.90	2	20	59.9	45
MS 716-15	1.095	23.38	3	10	52.9	45
MS 702-80	1.081	20.43	2	0	58.2	44
WNC 672-2	1.088	21.90	2	10	55.4	47
AC 77513-1 Russ						
WNC 567-1 Russ						
A 76147-2	1.089	22.11	3	40	50.3	36
AC 77652-1 Krantz	1.075	19.16	-	-	-	-
MN 11816						
BN 9820-3						
CF 7688-9	1.096	17.01	2	10	55.2	42
AF 522-1	1.083	20.85	2	10	52.4	41
NY 64	1.095	23.38	3	20	51.1	40
AF 522-5	1.098	24.01	2	60	58.2	47
BC 9668-1						
AC 79100-1						
AC 79128-1						
A 72685-2						
CD 7916-3						
MS 700-79						
B 6949-WV3						
W 752	1.103	25.07	2	20	57.9	42
WNC 285-18						
MN 12331						
MN 11705	1.079	20.00	-	-	-	-
MN 10874	1.084	21.06	3	40	44.4	31
B 9792-8B	1.099	24.22	3	30	51.9	30

Table 10. (continued) Specific Gravity, Solids, and Chipping Characteristics for Observation Trial Entries, Wooster, OH - 1986

Cultivar	Specific Gravity Water	Average Total Solids %	Chip Color PC/SFA	% Blister	Agtron E-5F	Agtron M-30A
CF 7523-1	1.087	21.69	2	30	56.2	31
BN 9803-1						
BN 9855-2	1.107	25.91	2	10	54.7	37
ND 534-4						
A 7411-2						
CF 7679-15	1.093	22.96	3	20	51.7	39
MN 12465	1.083	20.85	2	30	59.9	38
AF 236-1	1.075	19.16	-	-	-	-
BR 5662-WV13						
WNC 672-2	1.090	22.33	1	10	58.2	42
TC 582-1						
AC 77652-1						
NY 72	1.087	21.69	2	50	66.7	45
NY 71	1.081	20.43	2	50	56.9	44
W 779 Rus	1.093	22.96	2	50	51.3	41
Caribe	1.075	19.16	-	-	-	-
WIS 903	1.085	21.27	1	0	62.0	52
WIS 79-5						
WIS 855	1.095	23.38	2	40	64.3	44
WIS 848	1.086	21.48	2	30	56.0	37
ND 1538-1 RUS						
ND 1215-1	1.078	19.79	-	-	-	-
ND 698-1	1.084	21.06	2	20	59.6	44
ND 671-4 Rus						
ND 651-9	1.079	20.00	-	-	-	-
ND 1113-10 Rus						
Tolass (MN 7973)	1.077	19.58	-	-	-	-
NY 81	1.089	22.11	1	60	60.5	44
Kennebec						

OREGON

A. Mosley, D. Hane, S. James, G. Carter and C. Stanger

Introduction

Early Generation Selections: Approximately 90,000 single-hill progeny were planted in 1986. Survival was not greater than 50 percent for 50,000 field-transplanted seedlings at Hermiston, however. Seedling tubers at Hermiston (5,000), Powell Butte (30,000) and Ontario (7,500) performed satisfactorily. About three percent of the seedlings were selected for further evaluation by a team of northwest potato workers.

True seed for these trials were provided by J. Pavsek (Idaho). Seedling tubers were supplied by Oregon (25,000) and by D. Holm (Colorado), R. Johansen (North Dakota) and J. Pavsek (Idaho).

Typical 4- and 12-hill and replicated yield trials associated with a potato selection program were conducted on four branch experiment stations. Oregon selections will be shared with Idaho and Washington as part of a cooperative Tri-State program.

Replicated Trials: Fifteen replicated trials of advanced selections and varieties were conducted at nine locations. Trials were located in commercial fields (5), at the OSU main campus in Corvallis and on branch experiment stations at Hermiston, Klamath Falls, Ontario and Powell Butte. Oregon's contribution to the "Western Regional Trial" is presented elsewhere in this volume. This report summarizes results of 13 trials under the general headings of "Statewide Trial", "Columbia Basin Trials" and "Chipping Trials".

Statewide Trial

Twenty-three numbered clones were compared to Russet Burbank, Lemhi and Norgold on branch stations at Hermiston, Klamath Falls, Ontario and Powell Butte. Results are averaged and summarized in Table 1.

Powell Butte and Klamath Falls are high elevation, short season areas while Hermiston and Ontario have long growing seasons which afford extremely high yields. The two short-season areas cater to fresh market outlets whereas crops in the Hermiston and Ontario areas are geared to the frozen french fry industry.

The trials were grown using cultural and pest control practices common to the respective areas. The Ontario planting was furrow-irrigated; all others were watered using solid-set sprinklers. Planting dates ranged from early April through mid-May. All plots were harvested in early- to mid-October.

Eight of the 23 clones evaluated in this trial will be evaluated further; all others will be discarded. Selections to be retained include A74212-1, A081178-11, A081178-12, A081216-1, A081394-7, C0080152-1, C008177-2 and ND534-4. Selection A74212-1 will probably be named and released in 1988. It is extremely high yielding. Tubers are oblong-long, smooth in shape and lightly russeted when mature. Selection A74212-1 has low solids and will not fry well. Other tablestock selections include A081178-11, A081178-12 and ND534-4. The latter has performed extremely well for early tablestock uses, especially in the Columbia Basin. Selection ND534-4 matures about as early as Norgold, yields equally well and produces longer, more attractive tubers which are relatively resistant to hollow heart. It will be named soon and could replace Norgold in the Columbia Basin.

Selections A081216-1, A081394-7, C0080152-1 and C008177-2 have shown some promise for french fry processing. These four have been evaluated in replicated trials for only one year, however, and their characteristics have not yet been clearly established.

Columbia Basin Trials

Results of five Columbia Basin trials are summarized in Tables 2, 3 and 4. Four plantings were located on growers' farms in the area to determine performance of four clones under actual commercial conditions. Two plantings were harvested in early August and included Norgold as a check; the remaining two on-farm plantings were harvested in early October and used Russet Burbank as a standard. As shown in Table 2, Norgold produced slightly higher yields than the remaining three early-harvested entries. Norgold was extremely susceptible to hollow-heart, however, and lost popularity in 1986. A substantial percentage of growers will probably turn to ND534-4 or 78LC-1. The tubers of ND534-4 are extremely attractive, being somewhat longer and darker than Norgold. Selection ND534-4 is usually resistant to hollow-heart as is 78LC-1. The tubers of 78LC-1 sometimes tend to be pear-shaped and in these trials extremely susceptible to vascular discoloration at the stem end. Selection A74212-1 yields well early but matures too late to have well-set skins in August. Of the early-harvested entries, ND534-4 is probably most promising.

All three late-harvested selections outyielded Russet Burbank by a substantial margin (Table 3). The highest yielding clone, A74212-1, is considered suitable only for tablestock uses due to low solids and generally dark fry color. Skins of this selection can be too light in some situations, and it generally sprouts earlier in storage than Russet Burbank. Tubers tend to be long and well-shaped but sometimes overly

large. Selection A7411-2 fries satisfactorily and has shown moderate resistance to sugar-end fries in the Malheur area. Tubers resemble those of Russet Burbank, with slightly deeper eyes in some situations. Selection A74114-4 has shown some potential for early fresh market and/or early processing but will probably be omitted from further tests.

Seven selections were compared to Russet Burbank in an October-harvested trial at the Hermiston Agricultural Research and Extension Center. Cultural and pest control practices were similar to commercial practices in the area. None of the selections performed extremely well (Table 4). Selection A7917-1 yielded well but tubers tended to show blackspot bruises and internal brown spots. Selection A7919-1 also fried poorly. Of the remaining six selections, only ND848-3 will be considered for further evaluation. It showed good solids, moderately good yields and some resistance to hollow heart.

Chipping Trials

Selections for chipping were compared to Norchip at Hermiston, Klamath Falls and two Willamette Valley locations. Willamette Valley trials also contained five potential fresh market clones. The Tigard trial was located in a commercial field; all other trials received cultural and pest control practices common to the areas.

Selection NY81, a chipping selection from the Cornell University program, outyielded all others in all three locations it was planted (Tables 5, 6, 7). It produced higher solids than Norchip and tubers seemed to be less prone to hollow heart. Preliminary fry tests indicated that NY81 fry colors were similar to those of Norchip but perhaps slightly darker and more variable.

Selection ND860-2 consistently produced excellent chip color, generally lighter than Norchip. Yields of ND860-2 produced excellent chip color, generally lighter than Norchip. Yields of ND860-2 tended to be low as usual, probably due to early maturity and sensitivity to metribuzin. Because of early maturity and excellent chip color, ND860-2 may be a good choice for early processing.

Other selections of interest in these tests included ND534-4, NDA1309-6 and La0138 (Tables 5-8). Selection ND534-4 will soon be named and released by North Dakota. As usual it appeared to be better than Norgold for early fresh market uses; yields were higher and tubers were more attractive and less susceptible to hollow heart.

Selection NDA1309-6 produced medium yields of extremely attractive tubers at Tigard. Specific gravities were extremely high and chip color was acceptable. It appeared that this selection could possibly satisfy both tablestock and chip markets. However, additional tests aimed at increasing yields and determining chip quality are needed.

Oregon Table 1. Average yield, specific gravity, fry color and selected characteristics of 26 advanced selections and varieties at four Oregon locations. 1986.

Entry ^{1/}	Yield, Cwt/A		Specific Gravity	Fry ^{2/} Color	Comments ^{3/}
	Total	No. 1			
R. Burbank	553	382	1.082	M	Shape, HH
Lemhi	590	474	1.085	M	HH, BB
Norgold	471	385	1.072	P	HH
A74212-1	668	531	1.078	P	Slight HH
A7869-5	567	442	1.076	P	Slight HH. Discard.
A79141-3	595	449	1.087	M-G	HH, BB. Discard.
A7919-1	636	527	1.075	P	BB, IBS. Discard.
A799987-14	555	443	1.079	P	Discard.
A07869-20	609	471	1.082	P-M	BB. Discard.
A0792-4	458	388	1.085	M	Discard.
A079336-3	448	320	1.088	M	BB. Discard.
A080570-10	612	457	1.077	P	Severe BB. Discard.
A080576-5	525	406	1.071	P-M	BB. Discard.
A081178-7	537	410	1.072	P-M	HH, BC. Discard.
A081178-11	671	520	1.072	P-M	Keep for tablestock.
A081178-12	618	497	1.085	P-M	Keep for tablestock.
A081195-11	495	376	1.082	P-M	Discard.
A081216-1	534	417	1.083	M-G	HH, BB. Keep.
A081388-1	644	534	1.075	M	BB, IBS. Discard.
A081394-7	410	306	1.098	G	Keep for processing.
A081681-1	637	512	1.079	P-M	HH, BB. Discard.
A081772-5	569	474	1.080	P-M	Discard.
C008014-1	549	482	1.081	G	HH, IBS. Discard.
C0080152-1	532	438	1.083	M-G	BB. Keep.
C008177-2	414	320	1.087	G	Mild HH. Keep.
ND534-4	471	399	1.067	P-M	Keep for tablestock.

1/ Bred and selected in Idaho (A), Colorado (CO) and North Dakota (ND). Selected in Oregon (AO, COO).

2/ P = poor; M = medium; G = good.

3/ HH = hollow heart; BB = blackspot bruise; IBS = internal brown spot; BC = brown center.

Oregon Table 2. Average Performance of four clones on two commercial farms at Hermiston, Oregon. Early harvest, 1986.

Entry	Yield, cwt/A		Specific ^{1/} Gravity	Oz/ Tuber	Percent ^{2/}		
	Total	No. 1			HH	BC	VD
Norgold	534	408	76	5.8	17.6	2.0	6.0
A74212-1	536	400	74	6.3	2.0	0.0	0.6
ND534-4	478	370	73	6.2	3.3	1.3	8.0
78LC-1	484	351	75	5.2	0.0	0.0	40.0

1/ 1.0 omitted.

2/ HH = hollow heart; BC = brown center; VD = vascular discoloration.

Oregon Table 3. Average Performance of four clones on two commercial farms at Hermiston, Oregon. Late harvest, 1986.

Entry	Yield, cwt/A		Specific ^{1/} Gravity	Oz/ Tuber	Percent ^{2/}		
	Total	No. 1			HH	BC	VD
R. Burbank	738	435	81	7.3	2.0	0.6	6.0
A7411-2	990	739	86	13.4	2.0	0.0	0.0
A74114-4	773	622	73	10.2	7.3	0.0	2.6
A74212-1	1063	946	73	10.7	0.6	0.0	0.0

1/ 1.0 omitted.

2/ HH = hollow heart; BC = brown center; VD = vascular discoloration.

Oregon Table 4. Yield, specific gravity and percent hollow heart for 12 potato varieties and selections at Hermiston, Oregon. 1986.

Entry	Yield, cwt/A		Specific Gravity	% HH ^{1/}
	Total	No. 1		
R. Burbank	478	386	1.087	1
A7869-5	632	589	1.078	0
A7919-1	777	730	1.079	1
A7953-4	439	352	1.083	2
A7987-14	544	452	1.085	4
A79368-2	494	407	1.088	25
A8045-3	458	389	1.075	14
NDA848-3	650	567	1.081	0

1/ HH = hollow heart

Oregon Table 5. Performance of Eight Chipping Potato Varieties and Selections at Hermiston, Oregon. 1986.

Entry	Yield, cwt/A		Percent		oz/ Tuber	Spec. Grav.	Percent ^{1/}			
	Total	No. 1	No. 1	<4 oz			HH	BC	IBS	BS
AB-1	735	678	92.1	5.2	7.3	1.079	0.0	0.0	0.0	0.0
La0138	635	602	94.8	1.9	9.4	1.077	0.0	3.0	1.0	2.0
MS70083	720	637	88.5	7.8	7.5	1.075	0.0	4.0	0.0	2.0
NY71	680	636	93.6	3.1	8.4	1.081	0.0	1.0	0.0	5.0
NY72	564	518	91.8	4.6	7.5	1.086	0.0	2.0	0.0	13.0
NY81	887	851	95.9	2.3	9.6	1.084	0.0	1.0	1.0	12.0
NY82	683	635	92.9	4.2	7.9	1.072	2.0	0.0	5.0	0.0
Norchip	746	664	88.9	5.4	6.6	1.081	6.0	21.0	7.0	2.0

^{1/} HH = hollow heart; BC = brown center; IBS = internal brown spot;
BS = blackspot bruise.

Oregon Table 6. Performance of 12 Potato Varieties and Selections at Tigard, Oregon. 1986.

Entry	Yield, cwt/A		Percent		Spec Grav.	Chip ^{1/}	
	Total	No. 1	No. 1	<4 oz		Color	Comments
NDA1309-6	384	297	77.3	7.6	1.090	2	(2 to 4)
A74212-1	493	370	74.6	12.8	1.080	4	
MS700-83	382	314	81.7	9.8	1.077	2	
AB-1	398	338	84.6	10.1	1.083	3	VD
NY-71	398	338	84.9	6.3	1.076	2	good
NY-72	384	326	83.4	9.7	1.081	3	
NY-81	481	406	84.4	3.8	1.084	3	(3 to 5), SE
NY-82	345	281	81.6	10.2	1.075	2	VD
Norchip	430	310	72.3	8.7	1.078	2	good
La0138	381	325	84.6	4.3	1.084	2	VD
ND860-2	349	279	80.0	12.7	1.078	2	excellent
R. Burbank	476	310	64.4	16.4	1.083	4	
LSD, .05	83	85	8.6	4.3	0.006	-	-

^{1/} Ratings correspond to PC/SFA Color Chart. Low numbers = light color.
SE = dark stem end; VD = dark vascular ring.

Oregon Table 7. Performance of Eight Chipping Potato Varieties at Klamath Falls, Oregon. 1986.

Entry	Yield, cwt/A		Percent		Chip ^{1/}	
	Total	No. 1	No. 1	H.H.	Color	Comments
AB-1	566	478	84	13	5	lt. edges
MS700-83	454	389	86	10	5	very var.
La0138	452	407	90	0	3	lt. edges
Norchip	535	424	79	73	3	very var., dark spots
NY71	482	417	86	0	3	(1-5)
NY72	527	417	79	8	4	var.
NY81	709	642	91	23	3	sl. var.
NY82	360	278	77	0	1	var., dark spots

^{1/} Color ratings correspond to PC/SFA Color Chart. Low numbers = light color.

Oregon Table 8. Performance of 12 Potato Varieties and Selections at Corvallis, Oregon. 1986.

Entry	Yield, cwt/A		Percent		Spec. Grav.	Chip ^{1/}	
	Total	No. 1	No. 1	<4 oz		Color	Comments
R. Burbank	739	427	57.7	10.5	1.091	3	uniform
ND860-2	440	380	86.5	8.4	1.084	2	very uniform
ND398-1	574	475	82.6	9.1	1.085	3	var., SE
ND534-4	614	507	82.9	7.2	1.075	4	var.
Norchip	564	480	84.7	8.0	1.091	1	var. (1-3)
Rosa	473	392	82.9	7.1	1.085	2	var., VD, SE
A74212-1	891	666	74.9	4.9	1.088	5	slightly var.
AB-1	628	518	82.7	6.5	1.087	3	var. to 5
ND671-4	567	427	75.2	13.2	1.077	4	var. to 5
NY71	563	490	87.0	4.6	1.083	1	var., SE
NY72	628	507	81.0	6.7	1.094	1	var. (1-5)
Norgold	573	476	83.4	7.3	1.077	4	uniform
LSD, .05	87	85	8.9	3.7	0.005	-	-

^{1/} Ratings correspond to PC/SFA Color Chart. Low numbers = light color.
SE = dark stem end; VD = dark vascular ring.

SOUTH CAROLINA
CLEMSON COASTAL RESEARCH AND EDUCATION CENTER, CHARLESTON,
SOUTH CAROLINA

Wayne R. Sitterly

Procedure. A field of fine sandy loam was fertilized with 1200 lbs/acre of granular 5-10-10 on February 24, and then planted with selected tuber seed pieces. After planting, one lb/acre of technical Eptam herbicide was broadcast over the area and the area was immediately bedded. At drag-off cultivation the area received 30 lbs. of nitrogen per acre and 200 lbs. of granular 10-10-10 per acre. A randomized complete block design with 4 replicates was utilized, and each plot was 1/300 acre. Recommended pesticides were applied as needed.

Results. The growing season was extremely hot and extremely dry. Harvest occurred on May 28, 1986. The breeding lines B9955-28 and B9792-157 significantly produced a higher yield than any other item except B9955-10. No yield figure was actually considered good. The highest specific gravity was produced by breeding lines B9955-11, B9792-157, and B9935-8. Tuber size was considered too small for B9955-28, but no entry produced an unsatisfactory shape. Ozone susceptibility was exhibited by B9955-11, B9905-33 and B9140-32, and Kennebec was rough with large growth cracks.

Conclusion. The most satisfactory entry in this Irish potato variety trial appeared to be B9792-157.

South Carolina Table 1. Characteristics of entries in Irish potato variety trial.

Entry	Yield (100 CWT)	Sp. Gr. ¹	Tuber	
			Shape	Size
B9955-10	99	18.8	Oval	Large
B9955-11	48	20.4	Ov-elon	Sm-lg
B9955-28	108	17.9	Elongate	Small
B9955-33	66	18.8	Oval	Med
B9140-32	57	17.1	Ov-elon	Med
B9792-8B	51	19.3	Oval	Med
B9792-61	69	18.6	Oval	Med-lg
B9792-157	104	21.0	Ov-elon	Med-lg
B9792-158	87	15.7	Ov-elon	Large
B9935-8	78	21.0	Oval	Med-lg
Kennebec	87	17.5	Elongate	Med-lg
Pontiac	90	15.3	Ov-elon	Large
LSD ₅				

¹Specific gravity determined by potato hydrometer.

TEXAS

J. Creighton Miller, Jr. and Douglas G. Smallwood

Variety Development and Testing

Seedling Program. Approximately 52,000 first-year seedlings, representing 388 families were grown for selection near Springlake in 1986, and 325 original selections were made from this material. The 1986 first-year seedlings from Texas resulted from crosses made at the Texas Agricultural Experiment Station near Lubbock during the winter of 1984-85. The remainder were obtained from Joe Pavek in Idaho (23,342), Bob Johansen in North Dakota (9,460) Florian Lauer in Minnesota (1,000) and Dave Holm in Colorado (2,491). The Texas program also supplied the North Dakota, Idaho, and Colorado programs with second, third, and fourth sized seedling tubers for selection.

Adaptation Trials. The variety and advanced selection trials at Springlake were planted on April 18 and harvested on August 20. In general, yields were good considering the late planting date. The outstanding russet entry based on total yield and general rating was A 74212-1 (Table 1). Additional russet entries deserving mention include: Norgold "M", ND 1538-1 Ru, ND 534-4 Ru, Lemhi, Krantz, NorKing, LA 0138 and AC 77513-1. The selection ND 534-4 Ru has been a consistent performer for several years. Additional information is needed regarding cultural practices specific to Texas, in order to enhance total yield of this selection. The outstanding white entry (Table 2) was Denali #19, which is a strain selection from the variety Denali. Denali #19 has produced good yields the last two years and exhibits high specific gravity, but tuber appearance was poor resulting in a low general rating. Red LaSoda, Viking, NDTX 9-1068-11 R, Sangre #11, Sangre #14, Red Sport Viking and Sangre were the outstanding red entries. The advanced selection NDTX 9-1068-11 R, continues to look exceptionally good and is being considered for release in the near future.

A number of Norgold Russet strains, as well as Norgold Russet, were tested at Springlake (Table 3). Norgold "M", Norgold #11, Norgold #19 and Norgold #35 were the outstanding entries in this trial, based on total yield and general rating. Norgold "M" continues to be the most consistent performer of the Norgold Russet strains.

The strip trial at Olton (Table 4) consisted of 12 of the most promising varieties or advanced selections for which sufficient seed were available for strip planting of 300 foot rows. Four randomly selected plots were harvested for each entry. This trial was planted on April 11 and harvested on September 10. Vines of two entries, TC 582-1 and Denali #19, were still green at harvest. The outstanding entry in this

trial was NDTX 9-1068-11 R, which outyielded all entries with the exception of Red LaSoda. This selection retains its bright red color and does not have the deep eyes which are typical of Red LaSoda. The outstanding russet entries were TC 582-1, Norgold "M" and ND 534-4 Ru. TC 582-1 and Norgold "M" produced comparable yields and both significantly outyielded ND 534-4 Ru. However, the overall appearance of ND 534-4 Ru contributed greatly to its selection as one of the outstanding entries.

Summarizing the results from all trials at Springlake and Olton, the most promising selections were NDTX 9-1068-11 R and TC 582-1. Both of these selections show promise for release as new varieties. Norgold "M" continues to be the most consistent performer of the Norgold Russet strains. It is generally used as the standard russet variety on the Texas High Plains.

Texas Table 1. Total yield, percent of total weight over 4 ounces, average tuber weight of 10 ounces plus grade, average weight per tuber in ounces, plant type, vigor, and general rating of 36 potato varieties or selections grown at Springlake, Texas - 1986.

Variety or Selection	Total Yield CWT/A.	Percent by Wt. Over 4 oz.	Average Tuber Wt. of 10 oz.+ Grade	Average Weight/ Tuber in oz.	Plant, Type ^{1/}	Vigor ^{2/}	General ^{3/} Rating
A 74212-1	411.7	84.7	10.1	6.4	2.1	3.9	3.0
A 76260-16	363.2	78.6	10.8	6.7	2.4	3.0	2.3
Norgold "M"	333.6	79.1	8.6	5.5	2.9	3.5	2.6
Norgold Russet	311.8	75.2	10.9	5.4	3.0	2.6	2.6
MN 10874	304.3	75.6	10.9	4.8	2.9	3.6	2.6
ND 1538-1 Ru	302.0	79.0	8.9	5.0	2.6	3.3	2.6
AC 79128-1	277.6	84.5	8.9	3.5	2.1	4.0	1.6
ND 534-4 Ru	277.3	73.8	11.1	5.2	2.7	2.8	2.3
Lemhi	264.8	83.9	10.3	5.3	1.9	3.9	2.6
TC 582-1	259.3	84.6	12.5	4.9	1.7	4.0	2.3
TXA 867-1	259.3	75.4	11.7	4.5	2.1	3.5	2.3
Krantz	256.4	82.6	13.0	4.5	2.1	3.1	2.6
NorKing	244.5	86.4	9.1	5.1	2.2	2.7	2.6
TX 0-754-1 Ru	238.7	72.1	11.3	4.9	3.0	3.4	2.3
TX 9-655-20 Ru	237.8	73.4	10.9	4.6	3.0	3.1	2.3
NDA 1411-2	231.4	79.9	15.2	5.4	3.0	2.0	1.6
NDTX 9-1069-4 Ru	225.0	67.5	10.1	4.4	3.0	2.9	2.3
BC 9668-1	214.3	63.7	10.0	3.9	2.2	3.5	2.3
LA 0138	214.0	81.2	5.8	2.1	2.5	3.6	3.0
MN 12567	203.5	78.1	10.1	4.2	2.8	3.2	1.6
A 77101-12	200.9	78.8	12.4	4.9	2.5	3.4	2.6
MN 12465	196.0	79.9	9.1	2.4	3.0	3.1	1.3
AC 77513-1	190.5	82.0	9.4	5.2	1.6	3.8	2.6
A 72685-2	181.5	69.2	10.2	4.6	1.3	3.9	2.0
A 80644-2	178.0	71.9	14.8	4.3	2.3	2.9	2.0

Continued

Texas Table 1. Continued.

Variety or Selection	Total Yield CWT/A.	Percent by Wt. Over 4 oz.	Average Tuber Wt. of 10 oz.+ Grade	Average Weight/ Tuber in oz.	Plant Type ^{1/}	Vigor ^{2/}	General ^{3/} Rating
A 7816-14	173.6	63.8	8.2	4.1	1.8	3.9	1.3
AC 77652-1	168.7	70.5	9.3	3.9	2.6	3.4	1.6
MN 12161	165.8	60.6	8.5	4.0	2.8	3.2	1.6
Nooksack	157.1	66.2	6.2	3.2	1.1	3.9	1.6
TX 9-652-10 Ru	150.1	71.1	12.1	4.5	3.0	2.8	2.0
MN 12331	142.5	81.6	9.0	5.7	3.0	3.1	1.3
A 77101-18	138.8	80.1	8.6	4.3	2.4	3.3	1.6
MN 11705	135.6	73.1	8.6	2.1	3.0	2.5	1.3
NDA 848-3	128.3	72.9	9.4	3.9	2.3	3.8	1.6
A 8045-3	120.2	66.0	13.1	5.1	2.6	3.2	1.6
CO 7916-3	85.0	50.6	8.8	3.5	1.0	4.2	1.0
Average	220.7	75.0	10.3	4.5	2.4	3.3	2.1
LSD (.05)	63.9	9.1	4.1	1.5			

^{1/} 1 = upright, 2 = semiprostrate, 3 = spreading

^{2/} 1 = poor or weak, 2 = fair, 3 = medium, 4 = vigorous, 5 = very vigorous

^{3/} 1 = very poor to 3 = excellent

Texas Table 2. Total yield, percent of total weight over 4 ounces, average tuber weight of 10 ounces plus grade, average weight per tuber in ounces, plant type, vigor, and general rating of 19 red and white skin potato varieties or selections grown at Springlake, Texas - 1986.

Variety or Selection	Total Yield CWT/A.	Percent by Wt. Over 4 oz.	Average Tuber Wt. of 10 oz.* Grade	Average Weight/ Tuber in oz.	Plant ^{1/} Type	Vigor ^{2/}	General ^{3/} Rating
Red LaSoda	344.1	80.4	7.7	4.9	2.8	3.3	3.0
Viking	317.1	86.2	14.6	6.2	2.3	3.1	2.6
Sangre #11	299.1	75.5	7.5	3.8	1.6	3.9	2.6
Sangre #14	295.3	74.8	7.0	4.5	2.0	4.0	2.6
NDTX 9-1068-11 R	280.2	79.4	9.7	5.0	2.4	3.1	3.0
Denali #19	275.0	78.8	6.8	4.7	1.9	3.2	2.3
Sangre #10	259.9	84.3	9.8	4.5	1.6	3.9	2.0
Red Sport Viking	257.0	83.3	9.5	5.1	2.8	3.3	3.0
ND 1871-3 R	247.7	76.3	9.5	5.3	2.5	3.3	2.3
ND 791-5 R	243.9	72.6	18.0	4.2	2.9	2.6	1.3
Sangre	239.5	72.9	9.2	4.2	2.6	3.6	3.0
New Superior	225.6	65.6	8.9	3.7	2.2	3.4	2.0
A 7914-33	206.7	71.7	17.3	4.4	1.0	4.8	1.6
New Norchip	199.7	83.8	9.1	3.2	2.6	3.5	1.6
Atlantic	183.8	67.6	9.4	3.7	2.3	3.1	1.3
NDTX 2-1739-7 R	182.0	76.2	8.9	4.5	2.6	3.5	3.0
ND 1215-16	160.5	76.4	9.7	3.2	2.8	3.0	1.3
ND 1562-4 R	112.0	62.3	11.2	3.6	2.8	3.1	2.0
Shepody	51.6	27.6	0.0	2.1	1.9	3.6	1.0
Average	220.0	69.8	10.3	4.2	2.4	3.4	2.2
LSD (.05)	59.4	9.4	8.5	1.0			

1/ 1 = upright, 2 = semiprostate, 3 = spreading

2/ 1 = poor or weak, 2 = fair, 3 = medium, 4 = vigorous, 5 = very vigorous

3/ 1 = very poor to 3 = excellent

Texas Table 3. Total yield, percent of total weight over 4 ounces, average tuber weight of 10 ounces plus grade, average weight per tuber in ounces, plant type, vigor, and general rating of 6 Norgold Russet strains, as well as Norgold Russet grown at Springlake, Texas - 1986.

Variety or Selection	Total Yield CWT/A.	Percent by Wt. Over 4 oz.	Average Tuber Wt. of 10 oz.+ Grade	Average Weight/ Tuber in oz.	Plant ^{1/} Type	Vigor ^{2/}	General ^{3/} Rating
Norgold "M"	371.1	80.6	9.8	5.8	3.0	3.5	3.0
Norgold #11	336.2	77.0	10.3	4.4	3.0	3.3	3.0
Norgold #19	331.6	82.5	7.3	5.2	2.6	3.6	3.0
Norgold #35	311.8	76.2	8.2	4.6	3.0	3.3	3.0
Norgold #40	288.6	80.4	8.3	5.4	2.0	4.0	2.3
Norgold Russet	284.3	77.0	9.5	4.9	2.8	3.0	2.6
Norgold #12	282.8	78.0	11.1	5.1	3.0	3.1	2.6
Average	315.2	78.9	8.7	5.1	2.8	3.4	2.8
LSD (.05)	57.6	7.2	1.9	0.7			

1/ 1 = upright, 2 = semiprostrate, 3 = spreading

2/ 1 = poor or weak, 2 = fair, 3 = medium, 4 = vigorous, 5 = very vigorous

3/ 1 = very poor to 3 = excellent

Texas Table 4. Total yield, percent of total weight over 4 ounces, average tuber weight of 10 ounces plus grade, average weight per tuber in ounces, specific gravity, tuber type and skin type of 12 potato varieties or advanced selections grown in a strip trial at Olton, Texas - 1986.

Selection or Check Variety	Total Yield CWT/A.	Percent by Wt. Over 4 oz.	Average Tuber Wt. of 10 oz.+ Grade	Average Weight/ Tuber in oz.	Specific Gravity	Tuber Type	Skin Type
NDTX 9-1068-11 R	449.7	88.6	9.8	6.2	1.056	Oblong	Red
Red LaSoda	436.4	85.5	10.3	5.9	1.053	Oblong	Red
Denali #19	395.0	85.2	10.1	5.6	1.075	Oblong	White
TC 582-1	386.9	84.5	9.4	5.9	1.071	Long	Russet
Red Sport Viking	363.8	89.3	10.4	6.3	1.058	Oblong	Red
Norgold "M"	347.7	82.9	10.9	5.6	1.051	Long	Russet
Krantz	318.1	85.8	10.4	6.1	1.055	Oblong	Russet
ATX 9-77255-7 Ru	306.0	88.9	10.3	6.2	1.062	Oblong	Russet
Shepody	286.4	82.7	8.9	5.1	1.061	Long	White
ND 534-4 Ru	269.1	81.2	9.7	5.2	1.053	Oblong	Russet
NorKing	232.2	77.2	9.7	4.6	1.058	Oblong	Russet
ATX 9-7738-9 Ru	151.8	79.7	11.1	5.2	1.051	Oblong	Russet
Average	328.6	84.3	10.1	5.7	1.059		
LSD (.05)	59.4	9.7	1.9	1.0			

VIRGINIA

S. B. Sterrett, C. P. Savage, Jr., and W. R. Groton, Jr.

- Objective:** A total of 52 named varieties and advanced breeding lines were grown in replicated yield trials to evaluate regional adaptation and tuber quality. An additional 47 selections were evaluated in observational trials.
- Procedure:** Trials were planted on March 17, 1986, in a State sandy loam soil. Single row plots were 25 feet long with a 36 inch row spacing and 12 inch seed piece spacing. A randomized complete block design with four replications was used in all trials, except the unreplicated observational trials. Fertilization included 100 lbs N, 43.7 lbs P, and 83 lbs K/A banded at planting with 50 lbs N sidedressed on May 23. Linuron (0.5 lbs ai/A) + metolachlor (3.0 lbs ai/A) was applied at drag off. A total of 4 inches of irrigation was applied.
- Specific gravity was determined by weight in air, weight in water method. Ratings for internal defects were made on 20 tubers in the 2 1/2 - 3 1/4 inch (12 - 16 oz) size range.
- Seasonal Observations:** Total rainfall during the potato growing season was 4.42 inches or 28% of the 46-year average. Temperatures during the growing season were seasonable until early July when near-record warm weather was experienced. These factors may have contributed to the increase in quantity and severity of internal necrosis recorded this year. The prevalence and severity of external defects (heat sprouts and second growth) also was greater than in the previous two years. The marginal-to-unacceptable chip color of many of the clones reflected the color problems noted for commercial lots from this area and also could be attributed, in part, to the adverse growing conditions.
- Promising Clones:** Round White trials: Clones combining exceptional yield with desirable vine and tuber characteristics included AF875-15, B9581-10, and NY81. High yields and acceptable chip color were noted for AF875-15, B9792-157, and B9792-158. However, the rough, somewhat irregular shape of B9792-157 and B9792-158 may limit the acceptance of these two clones for fresh market. Although a trace of heat necrosis was found in several clones, Atlantic greatly exceeded all others in both amount and severity of this disorder. External defects were a problem with Pungo, CS76148-18, and B9792-54.
- Russet trial: Several clones exceeded the yield of BelRus. Those with a high percentage (>35% of marketable yield) of tubers in the larger sizes include NemaRus, B9596-2, B9882-15, B0019-2, and B0042-7. NemaRus and

B9596-2 were the only clones in this trial that combined improved yield with smooth, attractive tubers. External defects were noted for Russet Burbank, B9596-2, B9882-15, and B9882-16. Heat necrosis was a problem in B9885-4, B9922-11, and BelRus. Some discoloration was also noted in NemaRus and B9596-2.

Observational trials: Several clones exceeded the yield of Superior. The clones B0207-9 and B0254-1 were similar to Superior in ratings of appearance and skin maturity. In the observational russet trial, B0220-14 had the largest tubers and best appearance ratings (data not shown). Additional testing of these clones is warranted.

Virginia Table 1. Yield and size distribution of advanced round white selections - 1986.

Selection ¹	Yield >1 1/2" (cwt/A)	Usable Yield >1 7/8" (cwt/A)	% of Superior Yield >1 7/8"	% of Total Yield ²			Specific Gravity	Chip Color ³		
				B	SA	LA		Chef	Days After Harvest	7
Atlantic	283	246	132	12	14	53	20	1.092	6	7
Belchip	282	241	129	13	15	51	21	1.077	4	6
Chipbelle	273	228	122	14	19	57	8	1.088	4	7
La Chipper	290	224	120	20	21	50	7	1.081	-	-
Pungo	292	248	133	14	19	57	10	1.081	-	-
Superior	234	187	100	19	23	50	6	1.082	5	6
AF686-3	229	126	68	45	32	22	1	1.082	-	-
AF875-15	298	244	131	17	21	53	7	1.090	3	3
AS443-1	227	184	99	19	24	53	4	1.100	-	-
B9581-10	329	291	156	10	13	52	23	1.084	3	6
B9792-54	246	190	102	20	17	47	13	1.084	-	-
B9933-27	276	247	132	8	10	59	20	1.086	-	-
CS76148-18	303	252	135	16	18	52	13	1.071	4	6
CS78162-12	241	185	99	21	22	47	7	1.075	-	-
CS78188-1	261	175	94	32	35	31	0	1.077	-	-
CS78289-1	220	165	88	25	31	43	0	1.079	3	6
NY 64	323	219	117	31	29	36	3	1.085	3	5
NY 76	266	171	91	35	28	34	2	1.075	3	4
NY 77	259	195	104	24	25	45	5	1.082	2	5
NY 79	204	164	88	18	24	47	9	1.075	3	5
Waller-Duncan	30	28								
(P > .05)										

¹ Planted March 17, 1986, harvested July 11.

² Size distribution: B = 1 1/2" - 1 7/8", SA = >1 7/8" - 2 1/2", LA = >2 1/2" - 3 1/4", Chef = >3 1/4"

³ Unreplicated samples, 1-4 = acceptable, 5 = marginal, 6 or above = unacceptable.

Virginia Table 2. Vine and tuber characteristics of advanced round white selections - 1986.

Selection	Vine Rating ¹			Tuber Ratings ²				Defects ³					
	Size	Mat.	Poll.	Shape	Size	Appear.	Skin		Sp	Sun	2nd		
							Mat.	Gr.			GrCr	Heat Nec. #	Rate
Atlantic	6	5	9	2	7	7	6	9	8	7	9	13	6
Belchip	6	5	9	4	5	5	6	9	9	9	9	-	-
Chipbelle	7	4	7	5	6	6	6	9	6	9	9	-	-
La Chipper	6	6	4	4	6	6	7	9	9	9	9	-	-
Pungo	6	5	7	3	5	4	6	9	9	1	9	2	8
Superior	4	3	9	3	5	5	8	9	9	7	9	-	-
AF686-3	4	7	6	3	4	5	7	9	8	8	9	-	-
AF875-15	6	6	9	2	6	6	7	9	8	7	9	-	-
AS443-1	6	6	7	2	4	5	6	9	9	9	9	-	-
B9581-10	6	5	9	3	6	7	6	9	8	8	9	1	8
B9792-54	6	5	6	3	5	4	6	9	9	9	5	-	-
B9933-27	6	6	6	4	8	4	6	9	7	9	9	2	8
CS76148-18	7	5	9	3	6	5	5	9	9	4	9	-	-
CS78162-12	4	9	4	3	5	7	7	9	8	9	9	-	-
CS78188-1	5	7	9	4	3	4	6	7	9	9	9	-	-
CS78289-1	6	6	8	3	4	4	7	9	9	8	9	-	-
NY64	6	5	9	2	5	7	7	9	9	8	9	-	-
NY76	5	7	9	2	5	6	8	9	9	7	9	-	-
NY77	5	6	9	2	5	7	5	9	9	9	9	1	8
NY79	4	7	9	2	6	7	7	9	9	9	9	1	8

¹Plant Size: 1=very small, 9=very large. Maturity: 1=complete defoliation, 9=green and succulent.

²Shape: 1=round, 5=oblong, 9=very long (cylindrical). Appearance: 1=very poor, 9=excellent.

³Defects: 1=severe, 9=none. Ratings of heat necrosis made on 20 tubers in the 2 1/2" to 3 1/4" size.

Virginia Table 3. Yield and size distribution of selections with chip potential - 1986.

Selection ¹	Yield >1 1/2" (cwt/A)	Usable Yield >1 7/8" (cwt/A)	% of Atlantic Yield >1 7/8"	% of Total Yield ²			Specific Gravity	Days After Harvest		Chip Color ³
				B	SA	LA		4	7	
Atlantic	268	224	100	15	15	49	1.096	4		6
Norchip	238	164	73	31	29	38	1.087	4		6
Superior	217	183	82	15	22	56	1.084	6		6
B9423-4	282	224	100	20	23	48	1.080	2		4
B9792-136	252	232	104	7	9	45	1.079	4		6
B9792-13B	221	182	81	16	22	53	1.087	3		6
B9792-157	265	232	104	12	14	51	1.082	3		3
B9792-158	294	245	109	16	17	51	1.080	4		3
B9792-69	248	201	90	18	19	54	1.085	6		3
B9935-3	229	173	77	24	25	45	1.083	3		4
B9955-46	223	188	84	14	17	49	1.083	5		6
MS700-83	230	174	78	24	23	46	1.080	4		5
MS704-10	236	160	71	31	25	40	1.087	5		6
NY 71	213	176	79	17	24	51	1.079	4		5
NY 72	200	149	67	26	25	42	1.082	3		6
NY 81	267	228	102	15	16	52	1.079	5		6
NY 82	226	162	72	27	25	42	1.076	3		3
Waller-Duncan	32	29								

(P > .05)

¹ Planted March 17, 1986, harvested July 11.² Size distribution: B = 1 1/2" - 1 7/8", SA = >1 7/8" - 2 1/2", LA = >2 1/2" - 3 1/4", Chef = >3 1/4"³ Unreplicated samples, 1-4 = acceptable, 5 = marginal, 6 or above = unacceptable.

Virginia Table 4. Vine and tuber characteristics of selections with chip potential - 1986.

Selection	Vine Rating ¹			Tuber Ratings ²				Defects ³				Heat Nec.	
	Size	Mat.	Poll.	Shape	Size	Appear.	Skin Mat.	Sp	Sun	2nd Gr.	GrCr	#	Rate
Atlantic	6	6	7	2	7	7	6	9	8	9	9	8	7
Norchip	6	5	6	2	4	6	7	9	9	6	9	3	6
Superior	4	7	7	3	6	5	8	9	9	8	9	-	-
B9423-4	6	6	6	3	6	7	5	9	9	9	9	-	-
B9792-136	5	7	5	3	6	6	5	9	7	9	9	-	-
B9792-13B	6	6	9	3	6	5	5	9	9	9	9	-	-
B9792-157	5	6	8	3	8	6	6	9	9	6	9	1	8
B9792-158	5	7	6	3	5	5	7	9	9	9	9	-	-
B9792-69	6	6	7	3	6	5	5	9	9	7	9	-	-
B9935-3	4	4	5	3	4	6	8	9	8	9	9	-	-
B9955-46	5	5	8	3	5	5	5	9	9	9	9	1	8
MS700-83	6	6	7	3	4	6	6	9	8	9	8	-	-
MS704-10	8	8	8	2	5	6	6	9	9	9	9	-	-
NY71	6	7	7	2	7	7	6	9	9	9	9	-	-
NY72	5	5	6	3	5	6	6	9	9	9	9	-	-
NY81	4	4	5	2	4	6	7	9	9	9	9	-	-
NY82	4	4	8	3	5	6	6	9	8	9	9	-	-

¹Plant Size: 1=very small, 9=very large. Maturity: 1=complete defoliation, 9=green and succulent.

²Shape: 1=round, 5=oblong, 9=very long (cylindrical). Appearance: 1=very poor, 9=excellent.

³Defects: 1=severe, 9=none. Ratings of heat necrosis made on 20 tubers in the 2 1/2" to 3 1/4" size.

Virginia Table 5. Yield and size distribution of advanced russet selections - 1986.

Selection ¹	Yield >1 1/2" (cwt/A)	Usable Yield >1 7/8" (cwt/A)	% of BelRus Yield >1 7/8"	% of Total Yield ²			Specific Gravity
				B	SA	Chef	
BelRus	219	107	100	43	28	3	1.087
NemaRus	311	233	217	17	20	6	1.078
Norgold R	260	148	138	37	30	0	1.080
R.Burbank	200	16	15	34	6	0	1.083
B9596-2	260	166	154	28	25	3	1.073
B9882-12	213	93	87	48	26	0	1.080
B9882-15	209	133	124	20	17	5	1.077
B9882-16	177	65	61	33	17	0	1.078
B9885-4	267	85	79	59	18	0	1.075
B9922-11	247	107	99	19	19	2	1.086
B0019-2	267	163	152	32	24	4	1.087
B0042-7	233	151	140	29	27	3	1.082
B0042-15	210	47	44	71	16	0	1.083
B0045-12	205	50	47	71	16	0	1.083
Waller-Duncan	43	35					

(P > .05)

¹ Planted March 17, 1986, harvested July 11.

² Size distribution: B = 1 1/2" - 1 7/8", SA = >1 7/8" - 2 1/2", LA = >2 1/2" - 3 1/4", Chef = >3 1/4"

Virginia Table 2. Vine and tuber characteristics of advanced round white selections - 1986.

Selection	Vine Rating ¹			Tuber Ratings ²				Defects ³				Heat Nec.			
	Size	Mat.	Poll.	Shape	Size	Appear.	Mat.	Skin	Sp	Sun	2nd		GrCr	#	Rate
											Gr.	Gr.			
Atlantic	6	5	9	2	7	7	6	6	9	8	7	9	9	13	6
Belchip	6	5	9	4	5	5	6	6	9	9	9	9	9	-	-
Chipbelle	7	4	7	5	6	6	6	6	9	6	9	9	9	-	-
La Chipper	6	6	4	4	6	6	7	7	9	9	9	9	9	-	-
Pungo	6	5	7	3	5	4	6	6	9	9	1	9	9	2	8
Superior	4	3	9	3	5	5	8	8	9	9	7	9	9	-	-
AF686-3	4	7	6	3	4	5	7	7	9	8	8	9	9	-	-
AF875-15	6	6	9	2	6	6	7	7	9	8	7	9	9	-	-
AS443-1	6	6	7	2	4	5	6	6	9	9	9	9	9	-	-
B9581-10	6	5	9	3	6	7	6	6	9	8	8	9	9	1	8
B9792-54	6	5	6	3	5	4	6	6	9	9	9	9	5	-	-
B9933-27	6	6	6	4	8	4	6	6	9	7	9	9	9	2	8
CS76148-18	7	5	9	3	6	5	5	5	9	9	4	9	9	-	-
CS78162-12	4	9	4	3	5	7	7	7	9	8	9	9	9	-	-
CS78188-1	5	7	9	4	3	4	6	6	7	9	9	9	9	-	-
CS78289-1	6	6	8	3	4	4	7	7	9	9	8	9	9	-	-
NY64	6	5	9	2	5	7	7	7	9	9	8	9	9	-	-
NY76	5	7	9	2	5	6	8	8	9	9	7	9	9	-	-
NY77	5	6	9	2	5	7	5	5	9	9	9	9	9	1	8
NY79	4	7	9	2	6	7	7	7	9	9	9	9	9	1	8

¹Plant Size: 1=very small, 9=very large. Maturity: 1=complete defoliation, 9=green and succulent.

²Shape: 1=round, 5=oblong, 9=very long (cylindrical). Appearance: 1=very poor, 9=excellent.

³Defects: 1=severe, 9=none. Ratings of heat necrosis made on 20 tubers in the 2 1/2" to 3 1/4" size.

Virginia Table 3. Yield and size distribution of selections with chip potential - 1986.

Selection ¹	Yield >1 1/2" (cwt/A)	Usable Yield >1 7/8" (cwt/A)	% of Atlantic Yield >1 7/8"	% of Total Yield ²			Specific Gravity	Days After Harvest		Chip Color ³ After Harvest
				B	SA	LA		4	7	
Atlantic	268	224	100	15	15	49	1.096	4		6
Norchip	238	164	73	31	29	38	1.087	4		6
Superior	217	183	82	15	22	56	1.084	6		6
B9423-4	282	224	100	20	23	48	1.080	2		4
B9792-136	252	232	104	7	9	45	1.079	4		6
B9792-13B	221	182	81	16	22	53	1.087	3		6
B9792-157	265	232	104	12	14	51	1.082	3		3
B9792-158	294	245	109	16	17	51	1.080	4		3
B9792-69	248	201	90	18	19	54	1.085	6		3
B9935-3	229	173	77	24	25	45	1.083	3		4
B9955-46	223	188	84	14	17	49	1.083	5		6
MS700-83	230	174	78	24	23	46	1.080	4		5
MS704-10	236	160	71	31	25	40	1.087	5		6
NY 71	213	176	79	17	24	51	1.079	4		5
NY 72	200	149	67	26	25	42	1.082	3		6
NY 81	267	228	102	15	16	52	1.079	5		6
NY 82	226	162	72	27	25	42	1.076	3		3
Waller-Duncan	32	29								

(P > .05)

¹ Planted March 17, 1986, harvested July 11.² Size distribution: B = 1 1/2" - 1 7/8", SA = >1 7/8" - 2 1/2", LA = >2 1/2" - 3 1/4", Chef = >3 1/4"³ Unreplicated samples, 1-4 = acceptable, 5 = marginal, 6 or above = unacceptable.

Virginia Table 4. Vine and tuber characteristics of selections with chip potential - 1986.

Selection	Vine Rating 1			Tuber Ratings 2				Defects 3				Heat Nec.	
	Size	Mat.	Poll.	Shape	Size	Appear.	Skin Mat.	Sp	Sun	2nd Gr.	GrCr	#	Rate
Atlantic	6	6	7	2	7	7	6	9	8	9	9	8	7
Norchip	6	5	6	2	4	6	7	9	9	6	9	3	6
Superior	4	7	7	3	6	5	8	9	9	8	9	-	-
B9423-4	6	6	6	3	6	7	5	9	9	9	9	-	-
B9792-136	5	7	5	3	6	6	5	9	7	9	9	-	-
B9792-13B	6	6	9	3	6	5	5	9	9	9	9	-	-
B9792-157	5	6	8	3	8	6	6	9	9	6	9	1	8
B9792-158	5	7	6	3	5	5	7	9	9	9	9	-	-
B9792-69	6	6	7	3	6	5	5	9	9	7	9	-	-
B9935-3	4	4	5	3	4	6	8	9	8	9	9	-	-
B9955-46	5	5	8	3	5	5	5	9	9	9	9	1	8
MS700-83	6	6	7	3	4	6	6	9	8	9	8	-	-
MS704-10	8	8	8	2	5	6	6	9	9	9	9	-	-
NY71	6	7	7	2	7	7	6	9	9	9	9	-	-
NY72	5	5	6	3	5	6	6	9	9	9	9	-	-
NY81	4	4	5	2	4	6	7	9	9	9	9	-	-
NY82	4	4	8	3	5	6	6	9	8	9	9	-	-

¹Plant Size: 1=very small, 9=very large. Maturity: 1=complete defoliation, 9=green and succulent.

²Shape: 1=round, 5=oblong, 9=very long (cylindrical). Appearance: 1=very poor, 9=excellent.

³Defects: 1=severe, 9=none. Ratings of heat necrosis made on 20 tubers in the 2 1/2" to 3 1/4" size.

Virginia Table 5. Yield and size distribution of advanced russet selections - 1986.

Selection ¹	Yield >1 1/2" (cwt/A)	Usable Yield >1 7/8" (cwt/A)	% of BelRus Yield >1 7/8"	% of Total Yield ²			Specific Gravity
				B	SA	Chef	
BelRus	219	107	100	43	28	3	1.087
NemaRus	311	233	217	17	20	6	1.078
Norgold R	260	148	138	37	30	0	1.080
R.Burbank	200	16	15	34	6	0	1.083
B9596-2	260	166	154	28	25	3	1.073
B9882-12	213	93	87	48	26	0	1.080
B9882-15	209	133	124	20	17	5	1.077
B9882-16	177	65	61	33	17	0	1.078
B9885-4	267	85	79	59	18	0	1.075
B9922-11	247	107	99	19	19	2	1.086
B0019-2	267	163	152	32	24	4	1.087
B0042-7	233	151	140	29	27	3	1.082
B0042-15	210	47	44	71	16	0	1.083
B0045-12	205	50	47	71	16	0	1.083
Waller-Duncan	43	35					
(P > .05)							

¹ Planted March 17, 1986, harvested July 11.

² Size distribution: B = 1 1/2" - 1 7/8", SA = >1 7/8" - 2 1/2", LA = >2 1/2" - 3 1/4", Chef = >3 1/4"

Virginia Table 6. Vine and tuber characteristics of advanced russet selections - 1986.

Selection	Vine Rating ¹			Tuber Ratings ²				Defects ³				Heat Nec.	
	Size	Mat.	Poll.	Shape	Size	Appear.	Skin	Sp	Sun	2nd	GrCr	#	Rate
							Mat.						
BelRus	5	5	6	7	4	6	7	9	7	9	9	13	8
NemaRus	6	5	6	7	7	6	7	6	6	7	9	5	8
Norgold R	4	4	9	6	4	5	7	7	7	7	9	1	8
R.Burbank	8	9	9	6	3	1	3	4	7	1	9	1	8
B9596-2	5	4	5	7	6	5	7	9	9	3	9	4	8
B9882-12	4	4	7	6	4	4	6	9	9	8	9	2	8
B9882-15	5	4	8	7	6	4	8	9	7	5	9	-	-
B9882-16	3	3	6	6	4	2	6	9	9	9	5	-	-
B9885-4	5	4	9	7	3	3	6	9	9	6	9	8	6
B9922-11	8	9	9	6	5	3	5	9	9	7	9	9	7
B0019-2	5	4	5	6	6	5	7	9	6	8	9	-	-
B0042-7	3	3	9	5	6	6	6	9	6	8	9	3	7
B0042-15	4	4	8	7	5	6	6	8	9	9	9	2	8
B0045-12	7	5	6	7	4	6	7	9	7	9	9	1	7

¹Plant Size: 1=very small, 9=very large. Maturity: 1=complete defoliation, 9=green and succulent.

²Shape: 1=round, 5=oblong, 9=very long (cylindrical). Appearance: 1=very poor, 9=excellent.

³Defects: 1=severe, 9=none. Ratings of heat necrosis made on 20 tubers in the 2 1/2" to 3 1/4" size.

Virginia Table 7. Yield and size distribution of observational round white selections - 1986.

Selection ¹	Yield >1 1/2" (cwt/A)	Usable Yield >1 7/8" (cwt/A)	% of Superior Yield >1 7/8"	% of Total Yield ²			Specific Gravity
				B	SA	LA	
Atlantic	189	156	100	17	15	68	0
Superior	196	156	100	20	26	48	5
B9792-27B	203	163	104	20	18	54	8
B9792-30B	221	187	120	15	25	59	0
B0176-24	272	200	128	26	24	43	7
B0181-2	296	233	149	21	21	58	0
B0188-14	236	211	135	11	11	63	15
B0192-5	263	222	142	16	22	47	16
B0197-24	292	221	142	24	18	46	12
B0199-13	211	174	112	18	72	48	10
B0200-25	213	165	106	23	22	46	9
B0200-36	195	132	85	32	29	32	7
B0201-1	207	184	118	11	13	57	19
B0201-34	212	199	128	6	8	50	36
B0202-2	191	143	92	25	20	50	5
B0203-21	200	151	97	25	25	43	8
B0203-24	207	152	97	27	29	45	0
B0205-8	216	149	96	31	29	40	0
B0205-21	229	195	125	15	17	62	7
B0206-7	185	162	104	12	21	67	0
B0207-9	291	258	165	11	18	65	5
B0209-1	223	215	138	4	4	49	43
B0214-9	234	219	140	6	9	57	28
B0215-7	265	137	88	48	24	27	1
B0237-30	157	129	83	18	22	61	0
B0238-26	194	170	109	12	15	59	14
B0254-1	241	203	130	16	24	44	16

¹ Planted March 17, 1986, harvested July 11.² Size distribution: B = 1 1/2" - 1 7/8", SA = >1 7/8" - 2 1/2", LA = >2 1/2" - 3 1/4", Chef = >3 1/4"

Virginia Table 8. Vine and tuber characteristics of observational round white selections - 1986.

Selection	Vine Rating 1			Tuber Ratings 2				Defects 3			
	Size	Mat.	Poll.	Shape	Size	Appear.	Skin Mat.	Sp	Sun	Gr.	GrCr
Atlantic	6	6	5	2	7	7	6	9	9	9	9
Superior	4	4	8	3	4	5	8	8	9	9	9
B9792-27B	5	5	6	3	6	6	6	9	7	9	9
B9792-30B	6	7	8	4	6	6	7	9	9	9	9
B0176-24	7	7	9	2	5	7	6	9	9	8	9
B0181-2	5	6	8	4	6	4	6	8	9	6	9
B0188-14	4	4	8	4	6	5	6	7	4	6	9
B0192-5	6	6	6	3	6	4	6	9	9	9	9
B0197-24	6	6	9	3	6	7	-	7	9	5	9
B0199-13	4	3	7	3	6	7	6	6	9	7	9
B0200-25	3	5	7	3	4	4	7	5	7	5	9
B0200-36	4	4	7	3	3	5	8	9	9	8	9
B0201-1	3	4	5	2	6	7	7	9	6	9	9
B0201-34	5	5	7	3	7	6	7	9	9	9	9
B0202-2	4	4	5	3	5	5	7	6	9	8	9
B0203-21	5	5	7	2	5	5	7	9	9	8	9
B0203-24	5	5	8	2	5	5	8	9	9	7	9
B0205-8	5	4	7	2	4	6	7	9	9	8	9
B0205-21	5	6	9	3	4	5	7	9	9	9	9
B0206-7	4	5	5	2	4	6	6	9	7	7	9
B0207-9	5	5	7	3	5	5	8	9	9	9	9
B0209-1	6	6	9	2	6	6	6	9	7	9	9
B0214-9	4	4	7	3	7	7	7	9	9	9	9
B0215-7	3	2	5	2	5	6	-	7	9	6	9
B0237-30	6	5	9	3	5	5	6	9	6	7	9
B0238-26	4	4	7	3	5	6	8	9	9	9	9
B0254-1	6	5	7	3	6	5	8	9	9	9	9

¹Plant Size: 1=very small, 9=very large. Maturity: 1=complete defoliation, 9=green and succulent.

²Shape: 1=round, 5=oblong, 9=very long (cylindrical). Appearance: 1=very poor, 9=excellent.

³Defects: 1=severe, 9=none.

PERFORMANCE AND DISEASE, PEST, AND STRESS RESPONSE OF WESTERN
REGIONAL AND PRE-REGIONAL TRIAL ENTRIES AND OTHER LINES OF
INTEREST - 1986 WASHINGTON

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Ten numbered lines were compared with standard varieties in the 1986 Western Regional Trial and another ten were evaluated in pre-regional trials. Following are summaries of the performances of each of these lines compiled from Western Regional Trial reports of the past three years and results of our evaluations of these lines in nurseries designed to expose them to diseases, pests, and stresses they would encounter when grown in the Columbia Basin. Also included are performance profiles of four other fresh market lines being released or considered for release in the Intermountain West. The data on which these summaries and conclusions are based was collected by at least a dozen breeders and evaluators in Idaho, Oregon, and Washington.

Western Regional
Trial Entries

AD7267-3. This line was entered in the Western Regional Trials for the first time by California to be evaluated for the main-season, fresh market. It had small plants, slow emergence, mid-season maturity, fair yields of medium size, blocky to long, often malformed, deep-eyed, non-uniform russet tubers of fair to poor grade. It sometimes had serious elephant skin, growth cracks, shatter and blackspot bruising, and some hollow heart. It had low to medium solids, medium to high sugars, and produced fair to acceptable french fries. It did not store well, having bad rotting and only fair dormancy. It showed some resistance to scab, PVY, Columbia root-knot nematode, and Colorado potato beetles, but was susceptible to early dying diseases, leafroll virus, and soft rots. It did not perform well in the Columbia Basin and was dropped from the regional trials.

A7411-2. This line was entered for the third time by Idaho to be evaluated as a main-season, processing and fresh market line. It had medium-size plants, mid-season maturity, good yields of large, long, often rough, knobby and pear-shaped, non-uniform russet tubers with deep eyes and fair to good grade. It occasionally had growth cracking, leafroll net necrosis, and vascular discoloration, and often showed blackspot bruising. It was usually free of other internal defects. It had medium to high solids, low sugars, and produced good french fries. The fries had some dark-ends but less than Russet Burbank. They showed some after-cooking darkening and had a long cooking time. They have a relatively high vitamin C content. This line has only fair storability with short dormancy. It showed some resistance to early blight, PVY, soft and early blight rots, but was susceptible to scab, early dying diseases, leafroll virus, nematodes, Colorado potato beetles, and dry rot. It generally yields and fries better than Russet Burbank or Shepody and has fewer external and internal defects. It will probably be named and released.

A74114-4. This line was entered for the third time by Idaho to be evaluated as an early processing and fresh market line. It had small to medium plants, slow emergence, early maturity, and medium to good yields of large, long, smooth, russeted tubers, somewhat non-uniform but of good grade. It often had sparse tuber set. It generally had few external defects, except some growth cracking. It occasionally had serious internal brown spot, hollow heart, and vascular discoloration, and showed some leafroll net necrosis. It was resistant to bruising. This line had medium solids and sugar levels, so generally processed into acceptable french fries. It had fair storability. It showed some resistance to scab, dry rot, and Colorado potato beetles, but was susceptible to early dying diseases, nematodes, leafroll, PVY, soft and early blight rots, This line is currently being increased and considered for release.

A76147-2. This line was entered by Idaho for the second time to be evaluated as an early processing line. It had large plants, early maturity, very good yields of very large, long, blocky, smooth, buff-colored tubers of uniform type and size and good grade. It sometimes had protruded eyebrows and bad heat sprouts. The tubers usually skinned easily during harvest. Tubers sometimes had internal brown spot, hollow heart, growth cracking, and blackspot bruising, but they were usually better than Russet Burbank or Kennebec internally. It had medium-high solids, medium sugars, and usually produced acceptable french fries. It had short dormancy and built up sugars in storage. This line showed some resistance to powdery mildew, PVY, dry and early blight rots, but was susceptible to scab, Verticillium wilt, leafroll virus, nematodes, net necrosis, metribuzin, and soft rot. This line will be entered in regional trials a third year to be evaluated for early processing directly from the field.

A76260-16. This line was entered for the first time by Idaho to be evaluated as an early, fresh market and processing line. It had small to medium size plants, early maturity, good yields of very large, long, russeted, uniform tubers of good grade, with somewhat depressed pink-colored eyes. It had sparse tuber set. It sometimes had severe growth cracking, hollow heart, and blackspot bruising. It had fair to medium solids, and generally produced acceptable french fries with very few sugar or dark ends. This line showed resistance to leafroll net necrosis and dry and early blight rots, but was susceptible to scab, early dying diseases, leafroll virus, PVY, nematodes, soft rot, and Colorado potato beetles. It was dropped from regional trials.

AC79100-1. This line was entered for first time by Colorado to be evaluated as a main-season, fresh market and processing line. It had large plants, late maturity, medium to good yields of large, long, smooth, sometimes pear-shaped, russet tubers of good grade. It often had sparse tuber set. Occasional growth cracking, shatter and blackspot bruising was observed. It often had severe hollow heart, but few other internal defects. It had medium to high solids, medium to

high sugars, and generally produced acceptable french fries, except bad sugar ends occurred. It had fast cooking time. This line had only fair storability with short dormancy, but few rots were observed. It showed resistance to powdery mildew, but was susceptible to scab, Verticillium wilt, early blight, leafroll virus, PVY, nematodes, soft rot, and Colorado potato beetles. It will be tested again in 1987 regional trials.

A79141-3. This line was entered for first time by Washington to be evaluated as a main-season, processing line. It had medium-sized plants, late maturity, good yields of small to medium size, blocky to long, sometimes rough, knobby, pear-shaped, light-russeted tubers of poor to fair grade. It often had severe hollow heart, blackspot bruising, and growth cracking. It had very good solids, very low sugars, and produced excellent french fries, but with some sugar ends. It had only fair storability with short dormancy. It was susceptible to scab, early dying diseases, leafroll virus, corky ringspot, and PVY. Despite poor grade and internal defects, this line will again be tested in 1987 regional trials because of its cooking qualities.

C008014-1. This line was entered by Washington to be evaluated as a main-season, processing line. It had medium-sized plants, late maturity, good to very good yields of large, blocky, generally smooth, russet tubers of good grade, but with somewhat depressed eyes. It showed some growth cracking and shatter bruising and sometimes had serious blackspot bruising. Hollow heart and/or internal brown spot were often observed. It had medium to high solids and low sugars, and produced good french fries with very few dark ends, but some after-cooking darkening. This line has relatively high protein content. It had only fair storability with short dormancy and much rotting. This line was resistant to powdery mildew, but was susceptible to Verticillium wilt, leafroll virus, PVY, nematodes, Colorado potato beetles, and soft rot. This line will be entered in 1987 regional trials, watching particularly for blackspot and internal defects.

TC582-1. This line was entered a third time by Colorado to be evaluated as a main-season, processing and fresh market line. It had large plants, late maturity, low yields of oblong, small, smooth, non-uniform, heavy-russeted tubers of poor grade, because of small size. It occasionally produced knobs or growth cracks and sometimes had elephant skin, hollow heart, internal brown spot, or vascular discoloration. It occasionally showed some shatter and blackspot bruising. It had medium to high solids and low sugars, and produced good french fries, but with some after-cooking darkening. It showed good storability with medium dormancy and very little soft rot, but did build up sugars at low storage temperatures (45° F). This line had relatively high levels of protein and vitamin C. It showed resistance to scab and soft rot, but was susceptible to the early dying diseases, nematodes, PVY, leafroll virus, and some storage rots. This line will

probably be named and released in Colorado, but it has not done well in Northwest trials.

ND534-4 (Russet Norkota). This line was entered for third time by Oregon to be evaluated as an early, fresh market and processing line. It had small, determinant plants, early maturity, and medium to good yields of large, long, smooth, uniform, russeted tubers of excellent type and grade. It seldom had external or internal defects or bruising, except it did express bad leafroll net necrosis. It occasionally had some growth cracking, knobs, or hollow heart. It had low to medium solids levels, medium high sugar levels, and produced french fries that ranged from poor to acceptable in different trials. It had fair storability and dormancy, retaining good firmness. This line had some resistance to early blight rot, but was susceptible to early dying diseases, scab, leafroll virus, PVY, nematodes, soft rot, and Colorado potato beetles. This line has been increased and tested on a commercial scale in several areas and looks like a good replacement for Norgold Russet. It has been commercially processed into satisfactory frozen french fries.

Other Lines of Interest

A74212-1. This line is being named and released in Oregon as a fresh market variety. Though not entered in 1986 Western Regional Trials, it has previously been in these trials and is still being widely evaluated. It has large plants, early to mid-season maturity, and very high yields of large, oblong to long, sometimes rough and knobby, often pear-shaped, light-russeted tubers of generally good grade. It occasionally has sugar or dark ends, growth cracking, and blackspot or shatter bruising. It seldom has internal defects, except it does express leafroll net necrosis. It has low to medium solids levels, and high sugar levels, so produces dark french fries. It has fair storability. It has some resistance to early dying diseases, scab, Colorado potato beetles, and storage rots, but is susceptible to leafroll virus, PVY, and nematodes.

78LC-1 (HiLite). This line has recently been named and released as a possible replacement for Norgold Russet. It has very small plants, early maturity, and medium to good yields of medium to large, long, often pear-shaped, smooth, russet tubers of good type and grade. It is stress resistant and needs only minimal levels of irrigation and fertilization. It seldom has external or internal defects or bruising, except it sometimes has stem-end browning, especially if overwatered. It has medium solids and sugar levels, and generally produces good french fries. It has fair storability and dormancy, but tends to soften in storage. It has resistance to scab, leafroll net necrosis, and storage rots, but is susceptible to early dying diseases, nematodes, PVY, leafroll virus, early blight rot, and Colorado potato beetles.

AC77513-1. This line is being considered for release by Colorado as a main-season, fresh market variety. It has large plants, mid-season maturity, sometimes poor stands, low to moderate yields of large, oblong to long, often pear-shaped,

smooth, heavy-russeted tubers of good grade. In Northwest trials, it often has serious hollow heart and some vascular discoloration. Shatter bruising is sometimes serious. It usually has medium to high solids, but has high sugars and produces dark french fries. It shows some resistance to scab, but is susceptible to early dying diseases, nematodes, PVY, leafroll virus, and Colorado potato beetles. It has not performed well in the Northwest.

AC77652-1. This line is also being considered for release by Colorado as a main-season, fresh market variety. In Northwest trials it has had medium-sized plants, mid-season maturity, sometimes poor stands, low yields of medium-sized, oblong, smooth, non-uniform, heavy-russeted tubers of only fair grade because of undersize. It often has serious hollow heart and some internal brown spot. It has some growth cracks, but good bruise resistance. It has low solids and high sugars, and produces poor french fries. It has poor storability with short dormancy. It has shown some resistance to leafroll virus and net necrosis, but is susceptible to scab, early dying diseases, nematodes, PVY, and storage rots. It has not performed well in Northwest trials.

Pre-Regional
Trial Entries

A7816-14. This line was evaluated as a main-season, processing line. It had medium-large plants, medium-late maturity, good yields of large, very long, often malformed and pear-shaped, light-russeted tubers of fair grade. It was resistant to growth cracking and shatter and blackspot bruising, and had few internal defects. It had high solids and low sugars, and produced good french fries. It had relatively high protein and vitamin C content. It had only fair storability with medium dormancy, but had minimal rotting. This line showed good resistance to scab and Sclerotinia wilt, and some resistance to Verticillium wilt, leafroll virus, and PVY. It was susceptible to early blight, nematodes, and Colorado potato beetles. This line will be put in 1987 regional trials.

A7869-5. This line was evaluated as a main-season, processing line. It had medium-sized plants, medium-late maturity, very good yields of very large, blocky to long, sometimes rough, often pear-shaped, well-russeted tubers of medium to good grade. It tends to have deep eyes and very sparse tuber set. It had some growth cracking and shatter bruise, but was resistant to blackspot bruising. It had very few internal tuber defects, but had some serious sugar or dark ends. It had low to medium solids and low sugars, and generally produced acceptable french fries. It showed fair storability with medium dormancy and some rotting. It had some resistance to scab, but was susceptible to early dying diseases, leafroll virus, PVY, and nematodes. The tubers were too large and solids too low for processing, so it will not be further tested in regional trials.

A7919-1. This line was evaluated as a main-season, processing line. It had medium-sized plants, late maturity, extremely good yields of very large, blocky, sometimes knobby, russet

tubers of medium to good grade. It was resistant to growth cracking, but often had serious shatter bruise and sometimes serious blackspot. It occasionally had serious hollow heart and internal brown spot. It had low to medium solids and medium to high sugars, so often produced dark, poor-quality french fries. It had fast cooking time. It had relatively high glycoalkaloids and vitamin C. This line showed fair storability with medium to good dormancy, but much rotting. It was resistant to scab and showed some resistance to leafroll virus, but was susceptible to early dying diseases, PVY, nematodes, Colorado potato beetles, and soft rot. This line was dropped from regional trial testing.

A7946-10. This line was evaluated as a main-season, processing and fresh market line. It had small to medium plants, sometimes poor stands, medium-late maturity, low-to-medium yields of large, long, smooth, uniform, russet tubers of good grade. It rarely had growth cracks, but sometimes had bad shatter or blackspot bruising and serious hollow heart. Its solids ranged from low to high with medium sugars and often produced dark french fries. It had fast cooking time and relatively high protein content. It showed fair storability with medium dormancy, but much rotting. It was resistant to scab and had some resistance to Columbia root-knot nematode and Colorado potato beetles, but was susceptible to Verticillium wilt, leafroll virus, PVY, and soft rot. We will discontinue testing this line in regional trials.

A7953-4. This line was evaluated as a main-season, processing line. It had large plants, medium-late maturity, low to medium yields of medium to large, oblong to long, rough, knobby, often pear-shaped, non-uniform, russet tubers of poor to medium grade with a high proportion under 4 oz. It occasionally had growth cracking and some shatter and blackspot bruising. Some internal brown spot was observed, but this line seldom had internal tuber defects. It had low to high solids and medium to high sugars, and generally produced acceptable french fries. It had fast cooking time. This line showed good storability with medium dormancy and minimal rotting. It was resistant to scab and Verticillium wilt, and had some resistance to PVY and soft rots, but was susceptible to early blight, powdery mildew, leafroll virus, nematodes, and Colorado potato beetles. This line will be tested again in pre-regional trials.

A7961-1. This line was evaluated as a main-season, processing line. It had medium-large plants, medium-late maturity, medium to good yields of large, long, malformed, often knobby, deep-eyed, heavy-russeted tubers of poor grade. It was resistant to growth cracking and bruising, and had few internal tuber defects. It had medium to high solids and generally low sugars and produced good french fries. It had relatively high protein and vitamin C content. This line showed fair storability with medium dormancy and minimal rotting. It was resistant to scab and had some resistance to Verticillium wilt and Columbia root-knot nematodes, but was susceptible to leafroll virus, PVY, and Colorado potato

beetles. This line will be tested in the 1987 regional trials.

A7987-14. This line was evaluated as a main-season, processing line. It had medium-large plants, medium-late maturity, medium to very good yields of medium size, blocky to long, sometimes rough and knobby, non-uniform, heavy-russeted tubers of medium to good grade. It occasionally had growth cracking and elephant skin. It was bruise resistant and had very few internal tuber defects. It had medium to high solids and medium sugars, and produced poor to acceptable french fries. This line showed fair storability with medium dormancy and minimal rotting. It was susceptible to *Verticillium* wilt, leafroll virus, and PVY. We will discontinue testing this line in regional trials.

A79368-2. This line was evaluated as a main-season, processing line. It had medium-large plants, medium-late maturity, low to medium yields of small to medium size, oblong to long, sometimes rough, pear-shaped, heavy-russeted tubers of fair to good grade. It had resistance to growth cracking, shatter bruise, and sugar ends, but sometimes had serious blackspot. It often showed serious hollow heart and some internal brown spot. It had high solids and low sugars, and produced excellent french fries. It had a long cooking time. This line showed fair storability with minimal rotting, but had short dormancy. It was resistant to scab and soft rot, and showed some resistance to PVY, but was susceptible to *Verticillium* wilt, leafroll virus, and nematodes. We will discontinue testing this line in regional trials.

A8045-3. This line was evaluated as a main-season, processing line. It had medium-sized plants, mid-season maturity, low to medium yields of large, long, knobby, sometimes pear-shaped, heavy-russeted tubers of fair to good grade. It tended to have depressed eyes, serious growth cracking, hollow heart, and blackspot bruising, but was resistant to shatter bruising. It had low solids and low sugars, but generally produced acceptable french fries. This line showed fair storability with medium dormancy and minimal rotting. It was quite resistant to PVY and scab, but was susceptible to early dying diseases, leafroll virus, nematodes, and Sencor. We will discontinue testing this line in regional trials.

NDA848-3. This line was evaluated as a main-season, processing line. It had large plants, medium-late maturity, poor to good yields of large, blocky, smooth, russet tubers of good grade. It sometimes had serious growth cracking and some blackspot bruising, but seldom any internal tuber defects. It had low to medium solids and medium to high sugars, but produced fair to good french fries. It showed resistance to *Verticillium* wilt and some resistance to PVY, but was susceptible to leafroll virus. We will discontinue testing this line in regional trials.

WISCONSIN

R. E. Hanneman, Jr.

Genetics and Cytogenetics of the Tuber-bearing Solanum Species (Cooperative USDA, ARS and Wisconsin Agricultural Experiment Station)

Chloroplast DNA Variation and the Origin of *Solanum* *tuberosum* L.

By using a rapid method for determination of potato chloroplast DNA (ctDNA) type, 35 accessions of *S. tuberosum* and 113 accessions of ssp. *andigena* were determined for their ctDNA types. A wide ctDNA variation was recognized particularly in ssp. *andigena*. The polymorphism of a maternally inherited factor, ctDNA, indicates that ssp. *andigena* might have arisen many times. At least in this sense, ssp. *andigena* is a collective species.

Geographical cline from the Andean highlands to coastal Chile was found in their ctDNA types. This supports J. G. Hawkes' idea that Chilean ssp. *tuberosum* originated from ssp. *andigena*.

The Myatt's Ashleaf hybrid (a gift from Prof. P. Grun), of which the original female parent was the cv. "Myatt's Ashleaf", one of the relic cultivars of the early introduction of potato to Europe, had ssp. *andigena* type ctDNA. Therefore, this evidence supports strongly the idea of Salaman and Hawkes that the first European potato was ssp. *andigena*. Its derivatives were largely lost in the mid-19th century due to the late blight epidemic, and were replaced by ssp. *tuberosum* originally introduced from Chile. Therefore, the present common potato has the same ctDNA as Chilean ssp. *tuberosum*.

Investigations into the Role of Gibberellic Acid (GA) Mediated Gametophytic Selection in Reciprocal Differences of *Andigena-Tuberosum* Hybrid Families.

Large differences in yield have been observed in certain *Solanum tuberosum* Gp. *Andigena* x Gp. *Tuberosum* reciprocal hybrid families. These differences have been found to be dependent upon selection of parents at opposite maturity extremes. Gibberellic acid (GA) is reputed to be involved in the tuberization and maturation process of potatoes. Thus the involvement of GA in these reciprocal differences was suspected. Since different cytoplasms do not fully account for these unequal reciprocal yields, differences in the genetic constitution of the reciprocal families were also suspected. The hypothesis of this study was that GA plays a role in unilateral gametophytic selection resulting in genetically different reciprocal families with different yield.

Group *Tuberosum* cultivar 'Superior' and Gp. *Andigena* clone '11.1' were selected as model parents by virtue of the consistent and large reciprocal yield differences of their hybrid families.

When a solution of GA was applied to 11.1 pollen in the cross Superior x 11.1, the yield of the resulting family was lower than the family resulting from normal pollination.

Both Superior and 11.1 were found to be heterozygous for a recessive GA-related dwarfing locus 'g'. Experiments were conducted to assess the possible role of this locus in tuberization, gametophytic selection, and reciprocal yield differences by application of exogenous GA and genetic studies associated with yield trials.

Dwarf segregants of 11.1 selfed had significantly earlier tuberization and greater tuber set than their normal full sibs or dwarfs restored to normal phenotype by periodic spraying with GA.

Genotypes of individual plants from both reciprocal families were determined with respect to the g locus. The distribution of simplex, duplex, triplex, and quadruplex genotypes were similar in both reciprocal families, indicating a lack of g locus mediated gametophytic selection in these crosses. Tests comparing the relative yields of these genotypes indicated a dose dependent gene-cytoplasmic interaction in which yield is depressed by the dominant allele G in Andigena cytoplasm.

Reciprocal Cross
Differences and
the Advancement of
Germplasm in Bulk
Populations
Undergoing
Recurrent Selection.

Large reciprocal differences were reported by J. C. Sanford when a mixed population of Group Phureja and Gp. Stenotomum was reciprocally crossed with a population of Gp. Tuberosum haploids. In the progeny, reciprocal differences were observed for tuber initiation, tuber set, vine senescence, tuber yield, flowering, and male fertility. These differences were large in the F₁ generation, but were less dramatic when the populations were inter-mated to form F₂ generations. This study has been continued for two more cycles.

The four populations advanced through four cycles of intermating and selection are: Tuberosum haploid (HH), Phureja/Stenotomum (PP), Tuberosum haploid x Phureja/Stenotomum (HP) and its reciprocal, Phureja/Stenotomum x Tuberosum haploid (PH). Two other hybrid populations were also included in this study and they were the reciprocal populations derived from hybridizing the two most advanced parental source populations (HH and PP). These two populations are Tuberosum haploid (HH) x Phureja/Stenotomum (PP) designated HHPP and its reciprocal designated PPHH.

In this study, maturity and yield data are presented from both seedling and tuber source materials. The seedling data was collected in 1985 and the tuber data in 1986 at both Hancock and Sturgeon Bay. In general, maturity

scores became earlier with selection for tuberization and the hybrid progeny (HHPP and PPHH) were similar to the 4th cycle comparable populations (HP and PH).

In terms of yield, the tubers produced 3-4 times the yield of the seedling population from which they originated, yet the trends were very similar. There was little change in yield for the HH populations with selection and modest change in the HP population. Large changes in increased yields were noted for PP and PH populations. The greatest gains per cycle were noted for the PP and PH populations. The hybrid populations generally equalled or exceeded their 4th cycle counterparts from tubers which was not true for the PPHH populations as seedlings.

The fact that the PP and PH populations performed so much better than the HH and HP populations in the later generations is believed to be due to the differential selection pressure applied to these groups. With HH and HP populations, the upper half of the population was kept for intermating based on the yield of single hills, in contrast to keeping the upper quarter of the PP and PH populations. This difference was done to help counteract the reduced flowering of those populations in *Tuberosum* cytoplasm.

Several points can be made in conclusion. It appears that reciprocal differences do exist in early generations when parents of widely differing maturity are used and that they do parallel the maternal parent. Secondly, these differences disappear with future cycles of selection. Thirdly, F_1 heterosis is not a major factor to be considered in the development of such individual parent populations to be combined later, and thus population improvement can concentrate on the initial *Tuberosum*-species populations. Fourthly, that significant gain for yield can be made in the original source populations and that the differential rate of gain could be due to differential selection pressure for yield, which was applied to the population, indicating that progress can be made for yield based on selection of high yielding seedlings. Finally trends observed for yield and maturity in the seedling generation were generally confirmed in the tuber generation, indicating the usefulness of seedling maturity and yield data as a guide in population improvement.

